Financial Sustainability of PEFC Group Certification for Smallholder Farmers in Central Vietnam

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Abstract

Sustainable forest management and forest certification is a global issue. They are particularly important in Vietnam where forest covers above 40% of the country's areas. The thesis aims to anticipate the financial sustainability of PEFC group certification in central Vietnam through a comparison of the costs and benefits of certification, and an analysis of the Acacia value chain. The study sites are in three cooperatives in TTH province. The research approach is qualitative. Data are obtained primarily from observation, group focus discussion and semi-structured interviews with key informants from the management boards of cooperatives, farmers, traders, woodchip factories, furniture processing companies, and experts from governmental organizations and NGOs stretching from the north to the south. Besides, secondary data is collected from scientific journals, documents published and unpublished by the research institutions, and books.

Results confirmed the potential of smallholder forestry in securing the sustainable supply of industrial timber and improving the livelihood of farmers by providing a new income stream. However, the contribution of Acacia plantation to the total annual net income is modest, mainly due to small landholdings. The smallholders in Central Vietnam face many bottlenecks preventing them from maximizing benefits from planted forests, including limited access to land, high-quality inputs, capital, advanced silvicultural practices, and fair market. Besides, they bear a high risk of exposure to extreme natural events such as typhoons and floods. These obstacle is also limiting the participation of smallholders in voluntary verification schemes such as forest certification.

Engaging in forest certification is proven to create extra revenue for smallholders while reducing pressure on imported certified timber. The total costs of certification are affordable for smallholders if joining together under a single certificate. In Vietnam, forest certification is often associated with the planting of perennial trees for sawlogs and price premiums for certified timber. This scheme is argued inappropriate for smallholders in Central Vietnam, who are often described as high weather-related risks and financial fragility. Under the current situation, forest certification does not create tangible and intangible benefits for middlemen, woodchip factories and local carpenters. Smallholders and furniture processors are the direct beneficiaries. However, the circumstance is predicted to change in the future, resulting in the participation of all actors in the value chain in the forest certification.

This study also suggests several interventions for expanding forest certification, starting from recognizing smallholder farmers as a distinctly different category of forest producers whose conditions need to cautiously considered when developing standards for group certification. Secondly, there should be a strong focus on capacity building for the group entity as well as raising awareness for members of group certification. Thirdly, linking smallholders with private sectors are not only attracting more investment but also widening market access for farmers. Additionally, it must be mentioned the importance of secure tenure, clear guidelines for implementing SFM and forest certification, incentive policy and cost-sharing mechanism on insurance and certification.

Keywords

Forest certification; costs and benefits, economic benefits, value chain governance, Vietnam, Acacia plantation, smallholder plantation forestry

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Further information

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Acronyms and abbreviations

€	Euro (Currency)
$	US Dollar (Currency)
CA	Cooperative alliance
CoC	Chain of Custody
EU	European Union
EUR	The euro (currency)
FAO	Food and Agriculture Organization
FFD	Finnish Agri-Agency for Food and Forest Development
FGD	Focus group discussion
FLEGT	Forest Law Enforcement, Governance and Trade
FM	Forest Management
FSC	Forest Stewardship Council
GCG	Global commodity chain
GoV	Government of Vietnam
GVC	Global value chain
IRR	Internal rate of return
LEV	Land expectation value
MBI	Market-based instrument
MARD	Ministry of Agriculture and Rural Development
NPV	Net present value
ha	hectare
mha	Million hectares
NGO	Non-governmental Organization
PEFC	Programme for Endorsement of Forest Certification
SFM	Sustainable Forest Management
TTH (province)	Thua Thien Hue province
USA	United States of America
VAFS	Vietnam Academy of Forest Sciences
VCA	Vietnam Cooperative Alliance
VFCS	Vietnam Forest Certification Scheme
VNFOREST	Vietnam Forestry Administration
VPA	Vietnam-EU Voluntary Partnership
WB	World Bank
WWF	World Wide Fund for Nature (formerly World Wildlife Fund)

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1 Introduction

1.1 Rationale of the study

Vietnam ranks among the densely wooded countries in Southeast Asia with about 14.42 million hectares (mha) corresponding to 41.6% of the national territory covered by forests. With a dynamic wood processing industry, the country is now among the world-class producers of wooden products, making a total export turnover of nearly $9.4 billion in 2018. This country is also recognized as the biggest exporter of woodchip, surpassing Australia since 2012. The export of wood and timber products are without doubt an important part of the country's economy since 90% of the total furniture production is shipped to 120 countries mainly in Europe and the USA (Hoang et al. 2015b). Besides growing demand in the international market, the country's population of over 90 million people with a fast middle-class expansion and rapid urbanization has posed a lot of challenges for the sector. (To et al. 2019, World Bank 2019).

Despite the sector's steep growth, the demand for raw materials vastly outstrips available high-quality supply (Auer 2012; World Bank 2019). Due to low quality, domestic timber that is harvested from an estimated 90% of smallholding is mainly consumed as raw material for the pulp and paper industry with relatively low added value. The deficiencies in large size and certified timber make the wood processing industry severely dependent on external supply. On average, Vietnam imports about 4 to 4.5 million m^3 of logs annually, equivalent to $1.8 to $2 billion. Imported wood is diverse in terms of timber source and number of species. (MARD 2017). The situation is getting more onerous when the Government of Vietnam (hereinafter GoV) has placed a ban on the logging of natural forests, consequently resulting in the dependence on plantations for sources of materials. The replacement of imported timber by domestic supply is thus of great consequence for the sustainable development of the sector, benefitting both the country and farmers. Expanding planted forest areas coupled with third-party forest certification are potential for resolving the shortage of raw materials (Auer 2012). FFD (2016) also believes that participation in the forest certification programmes is among the most effective solutions

to help smallholder tree-growers to better access to the market and upgrade their position in the value chain.

With the government's objective to reduce reliance on imported wood, there is a timely opportunity for plantation forestry and smallholder farmers. Up to now, above 1.6 mha out of 4.1 mha planted forest have been allocated for 1.2 million Vietnamese farmers, providing them with a possibility for income generation and an excellent potential safety net (MARD 2017, World Bank 2019). The expansion of smallholder forestry is derived from the combination of emerging international markets, appropriate selection of tree species, policy reforms on forestland allocation and forest ownership, as well as external support from international development agencies. Responding to rising timber demand, contributing to smallholder farmer livelihoods, and a path to economic growth in rural regions are the additionally overarching drivers. At present, the Vietnamese commercial forestry sector is heavily reliant on plantations of Acacia hybrid due to its nature of being quickly grown, better resistance to adverse conditions, and sizeable yield advantage.

The rising export of wood and timber product is often associated with increasingly strict requirements from international markets. Concerns that illegal and poorly managed timber may enter supply chains has resulted in the development of regulatory and voluntary verification schemes for farmers and other participants in the supply and value chain. In May 2017, the GoV concluded the Vietnam-EU Voluntary Partnership Agreement (hereinafter VPA) on the EU Forest Law Enforcement, Governance and Trade (hereinafter FLEGT), which was later signed in October 2018 (World Bank 2019). This move shows an intensive effort and commitment to verify the legality of timber bound for the European market. Besides the Timber Legality Assurance Systems (TLAS), forest certification appears as a useful tool to combat illegal logging. There is an opinion that although FLEGT VPAs and forest certification schemes are different in terms of standards, scope, approach, and procedures, they are mutually supportive and increasingly harmonized. While certification can aid VPAs greater clarity on legality definitions, standards, indicators, and verification procedures, VPAs can conversely benefit from traceability mechanisms and the auditing process of certification. (World Bank 2012). This synergy needs particular attention, where both processes are in the early stages in Vietnam.

Not surprisingly, forest certification is a subject undergoing intense study in Vietnam, attracting the interest of many researchers. However, studies on the financial sustainability of smallholder certification are unfortunately limited. Focusing on the costs and benefits of group certification in Vietnam, this study is expected to enrich the literature on forest certification in developing countries.

1.2 Background of the study

This thesis is carried out under a collaboration between the Finnish Agri-agency for Food and Forest Development (hereinafter FFD) and the Viikki Tropical Resources Institute, University of Helsinki. Formed in 2012, FFD is a member of AgriCord, a non-profit development alliance having official development assistance (ODA) status with the Organisation for Economic Cooperation and Development (OECD). All the members of AgriCord implement the Farmers Fighting Poverty (FFP) programme, aiming to improve democracy and equality, reduce poverty, increase food security, and enhance the governance and capacity of farmers and farmers' organizations. Following the twining farmer-to-farmer approach, FFD currently has development projects in seven countries and supports more than 25 producer organizations in developing countries engaged in food and forestry production. FFD has operated in the forestry sector in Vietnam since 2012.

This thesis is conducted as a part of the project "Smallholders thriving for forest certification", under the third component dealing with the facilitation and pilot of PEFC group certification in three provinces in Central Vietnam. Targeting up to 9,300 households in three cooperative alliances in Thua Thien Hue, Quang Ngai, and Phu Yen province, the project focuses on building capacity for these farmers' organizations towards inclusive, profitable and sustainable forest management and forest certification. The project is expected to create direct benefits for 1,800 households after completion. (FFD 2016).

1.3 Objectives and research questions

The overall objective of the research is to anticipate the financial sustainability of PEFC group certification for smallholder farmers in Central Vietnam. Besides an analysis of primary participants in the Acacia value chain with a strong focus on smallholder farmers, the study gives a comparison between the costs and benefits associated with PEFC group certification, that is based on financial indicators of different scenarios. Four specific objectives are designed to clarify the overall goal and guide the entire research process:

- To examine the governance of Acacia value chain and to distinguish direct beneficiaries of group certification;
- To construct the baseline conditions of smallholder farmers;
- To determine associated costs, economic returns and other benefits of PEFC group certification; and
- To figure out the challenges and propose upgrading strategies for the development of PEFC group certification

Research sub-questions are formed following the objectives of the research (**Table 1**):

Table 1. Research questions

Is PEFC group certification financially sustainable in the Central Vietnam?	
Value chain governance	- How the governance of the acacia chain is structured? - Who are the direct beneficiaries from PEFC group certification?
Baseline conditions	- How are the baseline conditions of the smallholder farmers structured?
Direct costs and benefits	- What are the associated costs of PEFC group certification? - What are the main benefits of PEFC group certification? - Is PEFC group certification affordable for small timber growers?
Challenges and opportunities	- What are the main barriers of smallholders for PEFC group certification? - Which are the strategies for the development of PEFC group certification?

2 Approaches and theoretical framework

2.1 Approaches of the study

There are different approaches to identify the economic return of timber certification for small woodlot owners. In this study, the analysis of alternatives is adopted to explore the impacts of the PEFC group certification. Four scenarios are built upon assumptions that draw different outlooks of group forest certification. Numerous factors are considered, including net income, prices of timber, and ability of smallholders to access to the land and markets, yield and quality of wood. Besides a thorough analysis of Acacia value chain, the existing group certification models are studied to single out the potential benefits of PEFC group certification as well as barriers and challenges that may impair the accuracy of predictions. The sustainable livelihood approach is implemented to have a clear description of smallholder farmers in the study area. Eventually, knowledge about upgrading strategies helps contrive the development of smallholder forestry and forest certification in Vietnam.

2.2 Theoretical background

2.2.1 Value chain governance

The history of the chain metaphor development can be traced back to the 1970s when the French agriculturists' introduced the filière approach, in which the term **'filière'** is employed to describe a system, where products are produced and distributed to satisfy demand (Raikes et al. 2000). The approach is initially designed to improve the efficiency with which its colonies (plantation economies) could be able to supply the 'metropole' (Mitchell et al. 2011). By mapping out commodity flows, actors, and activities involved, this approach is an effective mean to understand economic processes. However, this approach has some constraints, including lacking a theoretical core, reflecting relations at a certain point in time, and generally limiting at national boundaries (Fromm 2007).

The term **'value chain'** is further developed and expounded by Porter (1985), being used as a core theoretical background for later studies. This term refers to the interlinkage of

activities performed by a firm operating in a specific industry so that it can generate valuable product or service from its conception to its end use and beyond (Kaplinsky & Morris 2001). This concept successfully draws attention to the interconnected and sequential nature of all economic activities that contribute to the ultimate value in the process. However, as a heuristic tool, this paradigm does not succeed in coordinating the chain internally as issues of corporate power, institutional context, and profound economic and social asymmetries are not taken into account (Ponte & Gibbon 2005).

The global economy has experienced significant changes since the 1980s as a consequence of international trade, in which countries and regions are integrated through international chains of production and exchange by specializing in either different branches of manufacturing or different stages of production within a single industry (Gereffi 1994, Armando et al. 2016). Bair (2009) believes that the most effective way to comprehend the relationship between the actors and activities in the global economy is to depict them as links in a commodity chain, which is often referred to **'a network of labour and production process whose end result is a finished commodity'** (Hopkins & Wallerstein 1986). A great deal of attention was drawn from scholars and policymakers, translating this notion into a growing body of global commodity chains literature. Gereffi and Korzeniewicz (1994) formulated the concept of global commodity chain (GCC) as a reflection of the existence of changing global economy, elucidating it as a set of inter-organizational networks clustered around a commodity or a product, which work towards economic and social development, connecting households, enterprises and nations in the global economy.

As stated by Gereffi (1994), GCCs are rooted in a production system and characterized by distinct dimensions: input-output structure, territoriality, governance structure and institutional frameworks, of which a governance structure that is perceived as the essence of the coordination of transnational production systems. The governance, as **'authority and power relationships that determine how financial, material, and human resources are allocated and flow within a chain'**, were intensively examined by Gereffi (1994, 1999) and his colleagues (2005, 2011) during two decades. In the light of the formulation of governance, it can either be distinguished by 'buyer-driven' or 'producer-

driven', which created a premise for two distinct types of later international economic networks: producer-driven and buyer-driven commodity chains. The attributes of a chain are determined upon a dominant party, so-called 'lead firm', which is in charge of the coordination of interaction between the links in the chain and upgrading activities in the individual links (Gereffi 1999, Ponte & Gibbon 2005, Bolwig et al. 2008, Fromm 2007). Commonly found in upstream controlled production systems with high technological and capital requirements, producer-driven value chain refers to vertical integration along all segments of the supply chain to leverage the technological or scale advantages of transnational manufactures or large integrated firms (Gereffi 1994, 1999, Gereffi & Fernandez-Stark 2011). As the name implies, in producer-driven value chains, integrated supplier, who tend to keep control of capital intensive operations and sub-contract more labour intensive functions, plays critical roles in coordinating the entire production network (Bolwig et al. 2008). In contrast, buyer-driven value chains represent labour-intensive consumer goods production, in which the production network of large retailers, branding enterprises, and trading companies are decentralized in many exporting countries, typically located in developing nations (Gereffi 1999, Fromm 2007). In this type of value chains, added values can be acquired through processing, design, marketing and branding functions. Suppliers are customarily required to adhere to standards and protocols even though their capabilities are often scarce (Bolwig et al. 2008, von Hagen & Alvarez 2011, Gereffi & Fernandez-Stark 2011).

As study by Sturgeon (2008) shows that, GCCs are based on a static, empirically situated view of technology and barriers to entry. Still, both are dynamic because of technological change and firm-and industry level learning. GCCs has then been replaced by global value chains (GVCs) with the belief that latter term possibly captures a broader variety of products, some of which lack **'commodity features'** (Ponte & Gibbon 2005, Bair 2009). A GVC can be identified by separate forms of coordination in various segments, yet a single and relatively coherent mode of overall governance. Governance in GVCs is often described as the organization of multiple activities for the sake of attaining a particular functional division of labour along the chain, which eventually result in the detailed allocations of resources and distributions of gains (Ponte & Gibbon 2005, Bolwig et al. 2008).

Given that a chain without governance is just a string of market relations (Humphrey & Schmitz 2002), a focus on governance is thus the centre of the GVC approach providing a useful way to examine how relationship between actors are organized and coordinated (Humphrey & Schmitz 2002, Gereffi et al. 2005). Forms of governance vary from the market (spot or repeated market-type inter-firm links) and the contractualization (between **'market'** and **'hierarchy'**, encompassing **'modular'**, **'relational'**, and **'captive'**). While the market is characterized by open, short-term trading relationships governed mainly by price to the hierarchy (vertical integration), the contractualization is governed by longer-term ongoing business relations. (Gereffi et al. 2005, Kilelu et al. 2017). Further works by Humphrey & Schmitz (2002) and Ponte & Gibbon (2005) argue that governance, in the sense of a clear dominance structure, is not necessarily a constitutive element of global value chains. Also, the power and coordination within chains are not needfully found in one firm; relatively, certain chains are decisively marked by different actors (Fromm 2007).

2.2.2 Upgrading smallholders in global value chain

In the context of the globalized era, companies and farms are required to perform new activities to ensure their involvement and position in global trade and markets. As a tactic to boost the position of an individual in international trade networks (Gereffi 1999, Armando et al. 2016), upgrading is used to characterize the trajectory of going up in the value chain. Riisgaard et al. (2008) defined upgrading as **'a positive or desirable change in chain participation that enhances rewards and/ or reduces the exposure to risks'**, in which rewards and risks are expressed not only in financial terms but also with regard to the environment, poverty alleviation and gender equity. In practice, upgrading is rarely successful without trade-offs between rewards and risks. Reducing the exposure to risks by avoiding forced exclusion from the chain and loss of assets is as important as increasing rewards (Riisgaard et al. 2008). In the global value chain literature, upgrading is commonly discussed in relation to governance, in a way that provides possibilities for producers to increase their profits and competences by either shifting towards more rewarding functional positions or producing more value-added goods. (Bolwig et al. 2010, Kilelu et al. 2017). This strategy is particularly beneficial for weak chain actors in the

developing countries, where the ability to effectively insert into GVCs is particularly important seeing that it is a vital condition for development (Gereffi & Fernandez-Stark 2011), to not only aim beyond returns but also improve their performance and enhance their competitiveness (Gereffi 1999, Gibbon & Ponte 2005, Giuliani et al. 2005, Ponte & Ewert 2005, Bolwig et al. 2008, 2010).

With regard to the typology of upgrading, Humphrey and Schmitz (2002) deconstruct four distinct categories that are presented as sequential and lately used as a background for many pieces of literature (Ponte & Ewert 2009). By reorganizing the production systems or adopting superior technology, process upgrading can transform inputs into products more effectively. Product upgrading refers to more sophisticated products which can be translated into higher prices in the market. Functional upgrading can be done through either acquiring new functions or the abandoning existing ones, both of which aim to improve the overall skill content of activities. Lastly, inter-industry upgrading is associated with the ability of the firms to use the competency learned in a new industry. While the first form show more efficient performance of the activities, the other three may result in a repositioning of firms in global markets (Armando et al. 2016). Aside from above strategies, Bolwig et al. (2008) emphasize the importance of other forms of upgrading, such as increased volumes even at a lower quality, standards and certifications, investment in logistics and lead times, higher price for the same product (Ponte & Gibbon 2005), entry in the value chain, backward linkages upgrading, or end-market upgrading (Fernandez-Stark et al. 2014).

There are various ways for small producers to engage and improve their participation in a value chain, yet generally based on two broad dimensions: forms of coordination and forms of upgrading (Riisgaard et al. 2008). Accordingly, the first component focuses on strengthening value chain coordination around the production node of the value chain that can be achieved either through vertical integration, increased contractualisation, or their incorporation. Whilst vertical integration represents the ability of one actor to perform multiple chain activities, contractualisation denotes longer-term and more complex economic relationships between chain actors, in this case between producers and buyers or among producers. The second component is related to different forms of upgrading in

the production node, such as improving product quality, increasing volume, complying with standards, etc. Typically, an upgrading strategy embodies elements of both components, of which strengthened coordination, particularly through contractualisation, is acknowledged as the standard and often powerful mean of achieving many of the forms of upgrading belong to the second component. (Bolwig et al. 2008, Riisgaard et al. 2008).

Upgrading strategies for small producers demands taking action to higher levels of decision-making in the course of the overall value chain. Linking and mobilizing resources from external sources, including strong actors or governors, are supposedly advantageous to smallholders, helping them more committed in the international development (Riisgaard et al. 2010, Kruger & du Toit 2007). Based on core theoretical background, Riisgaard et al. (2010) develop seven upgrading strategies for small producers that are grouped into three types: improve product, process and volume, change and add functions, and improve coordination (**Figure 1**). Different strategies can yield extra rewards, simultaneously face different levels of risks and performance requirements, implying the need for new competencies, investments and even networks.

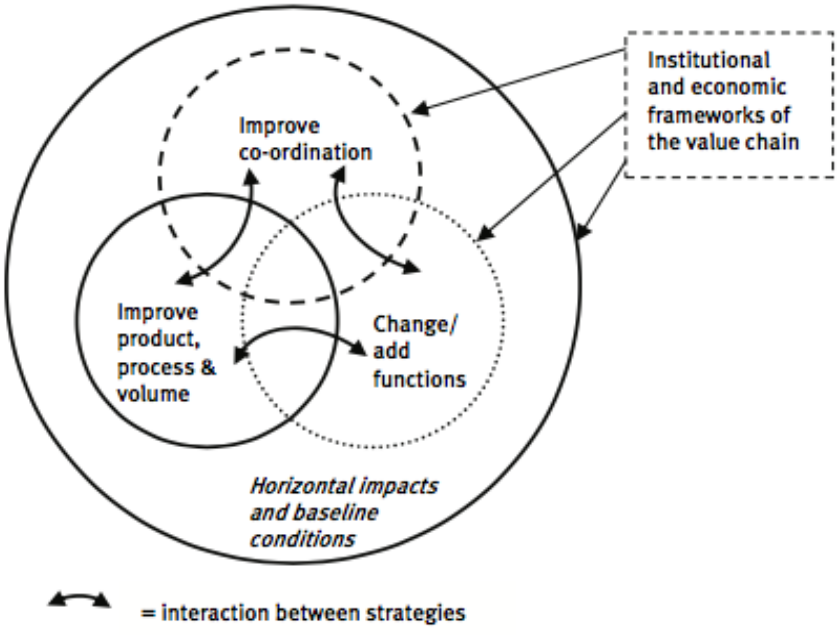

Figure 1. Types of upgrading strategies for small producers (Riisgaard et al. 2010)

While product and process strategies bear a strong resemblance to Humphrey and Schmitz's typology of upgrading, volume strategy aims to increase the amount of product sold through the rising yield or area. Also holding the same spirit of their third strategy, in the second group, functional upgrading is evolved and differentiated into functional downgrading indicating the situation where the producer moves one node down in the chain. Combined with economies of scale, functional downgrading is a promising action to maximize profits or to continuously exist in an increasingly demanding GVC (Bolwig et al. 2008). The last group is made up of two mechanisms that presumably reinforce overall chain performance in terms of cost, quality, volume, etc. (Riisgaard et al. 2010). Vertical integration remains its perception, yet contractualization, the rearmost upgrading strategy, is divided into vertical and horizontal dimensions. As the name implies, contractualization refers to the use of contracts as a mediator of exchange between chain actors. Vertical contractualization builds up closer and longer-term relationship with buyers by scrutinizing market requirements and interlocking deals where sales contracts include embedded services from the buyers. Significant advantages are recognized, including reduced price risks and marketing costs, and better access to the price premiums, market information, inputs and finance. However, vertical contractualization is often associate with higher performance requirements in quality, volume, and certification, which can be difficult and costly to fulfil. With the same purpose of allowing producers to achieve economies of scale and reduce transaction costs, horizontal contractualization differs from the vertical dimension in a way that encompasses agreements and cooperation among actors in the same node. Collective action that embraces input provision, marketing, or certification and institutional strengthening are often prerequisites of vertical contractualization and expectedly increase the bargaining power and performance of the smallholders. Timber certification, as a governance tool, can fall into this third upgrading groups. However, not limited to the coordination improvement, this intervention interacts with advancements of product, process and volume. (Bolwig et al. 2008, 2010, Riisgaard et al. 2010).

Successful upgrading is often observed in more tightly coordinate value chains where products are traceable upstream, in contrast with anonymous trade flows that count in auctions or numerous middlemen (Riisgaard et al. 2010). However, success is unable to

manage without institutional and economic frameworks, which either enable or limit the implementation of the chosen strategy. Riisgaard et al. (2010) emphasize the importance of interconnection between upgrading strategies and horizontal impacts and baseline conditions, in which horizontal refers to different dimensions of poverty, gender, labour and the environment. He further explained the pivotal role of baseline conditions in the feasibility and desirability of upgrading strategies. For instance, intervention with high risks or large capital investments is not the right choice for poverty-stricken producers.

2.2.3 Sustainable livelihood approach

Lawson (2007) perceives the possibility of people-centred approaches when dealing with upgrading smallholders in the value chain. In the guideline for designing and implementing action research in value chains, Riisgaard et al. (2010) emphasize the inclusion of all activities of smallholders and what their livelihoods depend. Sustainable livelihood approach (SLA), which focuses on the dependence of intervention on an appreciation of what underpins livelihoods (Morse & McNamara 2013) (**Figure 2**), is thus commonly selected to capture the baseline conditions of smallholders for the upgrading activity. Carney (2003) additionally compliments the potentiality of this principle in dealing with general governance issues.

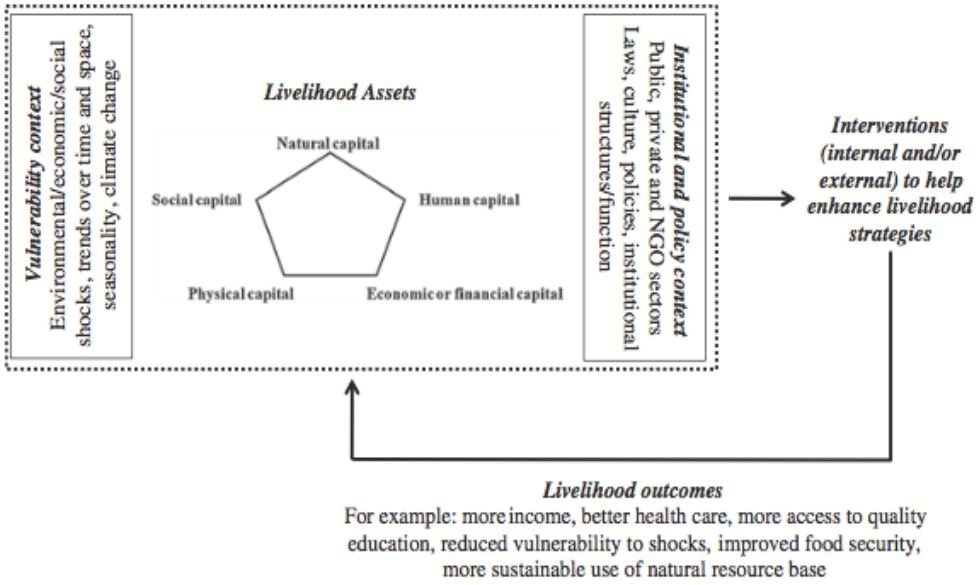

Figure 2. Sustainable livelihood framework (Morse & McNamara 2013)

Concerned first and foremost with human, the SLA works toward an accurate and realistic understanding of their strengths. At its core, capitals that are regarded as underpinnings of livelihood at the individual, household, village or group levels. Sometimes, the term **'capital'** are interchangeably used with **'asset'** that may not necessarily be owned by a household for it to be an important contributor to the livelihood (Morse & McNamara 2013). Capitals are commonly classified into five groups (DFID 2000, Adato & Meinzen-Dick 2002, Morse & McNamara 2013):

- Human capitals refer to education, skills, knowledge, health, nutrition, and labour-power;
- Social capitals embody any networks that increase trust relationships, access to opportunities, reciprocity, informal safety nets, membership in organizations;
- Physical capitals represent the necessary infrastructure such as transport, energy, communications and equipment;
- Natural capitals include land, water and biodiversity; and lastly
- Financial capital is associated with the availability of financing options.

The capitals, or assets core, is shaped by vulnerability context, and institutional and policy context. The vulnerability context over which people have limited or no control encompasses critical trends, shocks and seasonality. Trends refer to fashion in population, resources, and economic indicators such as prices, governance, or even technology. Shocks that are more unpredictable pertain to natural disaster, sudden economic changes or conflicts; and the last component is seasonality in prices, agricultural production, employment opportunities, resource availability, or health. Institutional and policy context, which are often considered at all levels, has both direct and indirect influence on livelihoods. It acts the part of determining access to capitals and source of influence, terms of exchange between different types of capitals, and therefore also returns of any given strategy. (Krantz 2001, Adato & Meinzen-Dick 2002, Morse & McNamara 2013).

2.2.4 Forest certification as a market-based instrument

For decades, the focus within environmental management has shifted from the traditional **'command and control'** measures, in which regulations set ambient, emission or

technology targets as well as penalties for the non-obedience of those standards, towards market-based instruments (MBIs) (Andersen & Sprenger 2000). Ebeling and Yasué (2009) refer to the term MBI as a catchall to all instruments with a price component. OECD (2007) defines market-based instruments as **'means to address the market failure of environmental externalities either by incorporating the external cost of production or consumption activities through taxes or changes on processes or products or by creating property rights and facilitating the establishment of a proxy market for the use of environmental services'.** Theoretically, MBIs possess several appealing properties that are superior over **'command and control'** approaches if adequately designed and carried out. A study by Zhang (2013) recognizes cost-effectiveness and motivation for technology innovation as the two most critical benefits of the market-based instruments. First of all, MBIs allow producers and consumers to flexibly decide upon their activities, which not only enable least-cost solutions but also increase their consciousness of the implications for the environment of their action. Secondly, these instruments encourage producers to adopt new technologies and facilities that give better results and simultaneously solve environmental problems. In addition, MBIs provide revenues which can be used to reinforce the incentive effects or to reduce other distortions in the economic system, and lastly promote resource conservation and transmission to future generations, for instance, through appropriate resource pricing. (Andersen & Sprenger 2000, Zhang 2013).

Pirard (2012) views forest certification as a form of MBIs that aims to provide producers with a premium, greater visibility and market share to favour ethical practices, being categorized under 'voluntary price signals' (**Table 2**). The certifying agencies are often referred to 'non-state market-driven governance systems' that sought to overcome the twin deficiencies of lack of state capacity and bounded jurisdiction (Cashore et al. 2004, Gale & Haward 2011). Under certain circumstances, forest certification acts as a powerful economic market-based instrument to increase awareness and offer incentives for both producers and consumers towards more responsible use of forests (Upton and Bass 2019). Presently, the Forest Stewardship Council (hereinafter FSC) and the Programme for Endorsement of Forest Certification (hereinafter PEFC) are the two most renowned forest certification schemes. Benefits offered by timber certification are undeniable; however,

some criticisms still exist. For instance, although participation in principle is voluntary, the company feels compelled to comply for fear of losing market share and access rather than as an aid for promoting their products (Upton & Bass 2019, Yadav 2016). At the same time, the inclusion of smallholders in certification schemes might exclude them from market growth as a result of implied investments (Reardon et al. 2001).

Table 2. Market-based instruments for biodiversity and ecosystem services: a lexicon (Pirard 2012).

	Exclusive characteristics	Specificities	Relation to markets	Examples of application
Direct markets	A market where an environmental product can be directly traded between producers and consumers (or processors)	Can be framed at the international level with specific rules for each country and a great variety of deals (generic resources), or as a more classical market with more or less processed products (NTFP)	Proximity to the market definition depends on cases and the degree of commodification	Generic resources, non-timber forest products (NTFP), eco-tourism
Tradable permits	An ad hoc market where users of an environmental resource need to purchase "permits" that can be further exchanged among resource users, thereby creating artificial scarcity	Designed to either serve a clear environmental objective (with bio-physical indicators) or based on acceptable social costs (market price for carbon)	Creation of a specific market for a given environmental objective, information are expected to be revealed	Mitigation banking for biodiversity, emission quotas in the European ETS, Individual Transferable Quotas for fisheries, tradable development rights for land, voluntary carbon markets*
Reverse auctions	A mechanism whereby candidates to service provision set the level of payment (if accepted) in response to a call by public authorities to remunerate landholders	Aimed at revealing prices and avoiding free-riding and rent seeking	Creates an auction-based market that favours competition among bidders for achieving cost-efficiency	Payments for ecosystem services (e.g. BushTender in Australia, CRP in the US)
Coasean-type agreements	Ideally spontaneous transactions (free of public intervention) for an exchange of rights in response to a common interest of the beneficiary and the provider	Requires clear allocation of property rights, highly site-specific and difficult to replicate on a large scale	Usually not following market rules, more of a contractual nature	Payments for ecosystem services ala Wunder, conservation easements, conservation concessions
Regulatory price signals	Consists in regulatory measures that lead to higher or lower relative prices	Part of a fiscal policy (including subsidies) with environmental objectives and complete control by public authorities	Based on an existing market	Eco-tax, agro-environmental measures
Voluntary price signals	Consist in schemes whereby producers send a signal to consumers that environmental impacts are positive (in relative terms) and consequently gain a premium on the market price	Still limited as an incentive for action due to relatively low willingness to pay by consumers	Uses existing markets to identify and promote virtuous activities	Forest certification, labels for organic agriculture, norms (self-produced before certification)

* These voluntary carbon markets stand as an exception in this category, as they are of private initiative and are not derived from publicly led commitments (as for fisheries, greenhouse gas under the Kyoto Protocol, etc.).

A study by Ebeling & Yasué (2009) discerns the capacity of certification in enhancing forest management in countries where governance capacities are insufficient for appropriately manage natural resources and enforce pertinent regulation. In practice, there are a large number of published studies (Rametsteiner & Simila 2013, Hoang et al. 2015, Ven & Cashore 2018) that describe the introduction of forest certification as a failure of government control measures. In practice, forest certification often interacts with conventional governance frameworks and institution, including governmental agencies that regulate the national forestry industry and private timber sectors (Lewin et al. 2018).

2.2.5 Timber certification: History and development

Producers participating in global value chains nowadays are required to conform to a group of predefined standards agreed upon by either international bodies or private sector lead firms (Kaplinsky 2004, Fromm 2007). The globalization puts market-based pressures on global firms in a way that promotes higher standards of social and environmental responsibility in production processes and trade relations. It means firms will face various risks resulting in loss of business if the sustainability of their product is not accepted by demanding customers. Standards are exceptionally important for farmers and firms in developing countries owing to their determination of access to specific segments of the market, particular countries, and the terms of participation in global chains (Bolwig et al. 2008, 2010). Kaplinsky (2010) clarified some grounds for the importance of standards, which are further linked to voluntary certification schemes for smallholders in developing countries:

- Standards have turned out to be a crucial determinant of market access, particularly in high margin niche markets;
- Product and process standards play an essential role in defining many high-margin market segments;
- Enhancing capacity to comply with, and simultaneously develop capabilities and efficiency;
- Besides being costly, the compliance with standards create specific barriers of market access; and

- Systematic coordination along the chain is required, but not necessarily and easily achieved.

Many standards are enforced through certification. Humphrey (2005) believes that the necessary enforcement of increasingly important standards and certification leads to a continuous learning process along with the chain developing countries, which is particularly crucial in the area of backward linkages. There has witnessed a growing demand for standards and certification in wood and other value-added timber products that heavily depend on natural resources and threaten the sustainability of the global forest (Morris & Dunne 2011). Few policy momentums and research efforts currently surround certification as an effective upgrading strategy for smallholder farmers and their cooperatives in the fields of coffee (Muradian & Pelupessy 2005, Kiemen & Beuchelt 2010, Rueda & Lambin 2013), or shrimp (Tran et al. 2013); however, forestry-focused works are still limited.

The history of forest certification began in the early 1990s, aiming to tackle concerns of deforestation and forest degradation and to foster the maintenance of biodiversity, particularly in the tropics (Rametsteiner & Simula 2003). It is often used as a way of informing consumers about the sustainability of the forests from which wood and wooden products are produced. Forest certification is a voluntary process by which forest practices are assessed against a set of predefined standards agreed upon through independent audits (Maryudi 2017). Initially developed by environmental groups, it is presently recognized as a powerful instrument to promote sustainable forest management (SFM), which is officially defined as '**the stewardship and use of forests and forest lands in a way and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality, and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems'** (MCPFE 1993). The basic perception underpinning timber certification is the responsible management of forest with equal emphasis on the social, environmental, and economic aspects. However, in developing countries, where forest certification was initiated, the influence of certification as a marketing tool to encourage SFM is very little till date, and the markets for certified products are still limited

(Yadav 2016). Improvement of market access and premium prices for certified products are proved as the dominant reason for pursuing timber certification. In practice, a distinction is made between the certification of forest management (hereinafter FM) and certification of the 'chain of custody' (hereinafter CoC). FM certificate guarantees that forest is sustainably managed in compliance with a specified set of standards, and often apply for tree growers. Meanwhile, CoC certificate is granted for other participants through the whole chain of processing and distribution, verifying that wood from non-certified sources is identified or kept separate from the certified end product. A product is labelled as certified when both FM and CoC certification are obtained. (Nussbaum & Simula 2005).

Established in 1994, FSC is recognized as a response to the failure of the 1992 Earth Summit in Rio in producing an agreement to stop deforestation. It is formed by a committed group of business, environmentalists, and community leaders with a set of ten principles and 70 criteria. (FSC 2020a). To date, FSC is acknowledged as the world's most trusted SFM solution. Firstly introduced five years later, PEFC is currently the world's leading forest certification system in term of areas with two-third of all globally certified forests and one-third of all globally awarded CoC. It initially formed under the name Pan European Forest Certification by small- and family forest owners from EU. At present, more than 300 million ha of forest area is managed in compliance with PEFC's internationally accepted Sustainability Benchmarks. (PEFC 2019).

As an umbrella scheme for national forestry standards, PEFC offers a system-based standard, establishing a framework for the development and recognition of national or subnational forest certification schemes. These programs are developed nationally, according to internationally recognized requirements for SFM, and are certified by independent third parties. PEFC neither counts on independent on-the-spot inspections nor demands annual inspections, applying random checks. Since its inception, PEFC quickly developed a group certification model that made the certification of small forest areas possible and more cost-effective. As stated by Meijaard et al. (2011), PEFC group certification of smallholdings can be done through either a group of individual owners or a regional group drawing on local organizations of forest owners. In reality, PEFC is

currently engaged in a series of projects around the world, which support small landholders in pursuing certification. (Pattberg 2005, Meijaard et al. 2011, PEFC 2019).

FSC and PEFC are well known as the leading forest certification schemes that share the same ultimate objective but operate differently in many ways, including governance, consensus, accreditation, national accreditation, and fees. Firstly, FSC prohibits the certification of plantations established on cleared native forest or high conservation forests while PEFC allows conversation in limited circumstances. Secondly, FSC is a single scheme, which imposes consensus-driven principles, and accreditation can only be achieved with agreement from all three chambers. PEFC endorses the variety within and between national systems, accepts consensus that may not be achieved, and provides mechanisms for accreditation that reflect this. Thirdly, FSC is self-administered, and auditors are accredited by FSC International. PEFC also requires compliance with ISO and International Accreditation Forum standards: both are independent of PEFC or its subsidiaries. In relation to national accreditation, FSC has a set of Principles and Criteria (P&C) applying internationally for all types of forests. It allows countries to establish national standards that meet the FSC P&C; however, this approach has so far only exercised in few countries, which have a relatively high level of forest management capacity, such as Germany and Sweden (Buckingham & Jepson, 2013). Meanwhile, PEFC accredits national standards that align with its principles and criteria, allowing the endorsed systems to operate independently. Regarding the fee, FSC collects all fees which are transferred to a central office and then reallocated the money to the national initiatives. PEFC allows the National Governing Body to retain most of the fees in-country. Last but not least, PEFC is the only scheme that incorporates a requirement to contribute to reducing carbon emissions.

2.2.6 Economic indicators

Net present value and internal rate of return are two economic indicators that are widely used to evaluate the economic performance of forest plantation (Pitigala & Gunatilake 2011, Hoang et al. 2015a, Maraseni et al. 2017a, Phimmavong et al. 2019, Tran et al. 2020). Being the principal concepts of cooperation finance, these two concepts are closely

interpreted in association with discounted cash flow (DCF), which is an intrinsic value approach to evaluate a stream of cash flows expending over a number of years. In essence, DCF analysis aims to discover the today's value of an investment, based on projections of how much it will generate in the future using a discount rate, which is used interchangeably with a rate of return, hurdle rate, or opportunity cost. The term **'opportunity cost'** is employed due to **'the return that is foregone by investing in the project rather than investing in financial markets'**. (Brealey et al. 2011). The formula of DCF is:

$$PV = \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_2}{(1+r)^3} + \cdots + \frac{C_T}{(1+r)^T} = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t}$$

Of which, C_T is the future cash flow at time *T, t* is the number of time periods, *r* is the rate of return, and Σ refers to the sum of the series.

Net present value (NPV) presents the contribution of an investment to wealth by comparing the difference between the present value of cash inflows and the present value of cash outflows over a period of time. Brealey et al. (2011) highlight three key points about NPV: (1) a dollar today is worth more than a dollar tomorrow; (2) NPV depends solely on forecasted cash flows from the project, and the opportunity cost of capital; and (3) NPV can be added up as they are discounted to the today's value. NPV is calculated by subtracting the cost of the investment from the sum of the DCFs, or the return on the investment. It can be simply found by adding the initial cash flow to the DCF:

$$\text{NPV} = C_0 + \text{PV} = C_0 + \sum_{t=1}^{T} \frac{C_t}{(1+r)^t}$$

Of which, C_0 is the cash flow at time 0 and usually negative. An investment is deemed as profitable the NPV is positive. On the contrary, an investment with a negative NPV is related to a net loss. In general, a combination of NPV and DCF will help make an informed decision.

DCF rate of return, or **internal rate of return (IRR)**, is the discount rate that gives a zero NPV. The rule of IRR is a closely relative of NPV; therefore, it supposedly generates the same results if used properly. An investment can be accepted if the IRR is higher than the opportunity cost of capital. The formular for IRR can be found as:

$$NPV = C_0 + \frac{C_1}{1+IRR} + \frac{C_2}{(1+IRR)^2} + \cdots + \frac{C_T}{(1+IRR)^T} = 0$$

Often having used in a cost-benefit analysis, the **benefit-cost ratio (BCR)** indicator is used to show an overall relationship between the relative costs and benefits of an investment. The rule of using the BCR is that, an investment with the BCR greater than 1.0 will have a positive NPV, and a higher IRR compared to the discount rate used in the DFC calculations. If the BCR is equal to 1.0, the NPV of expected profits is the same as the costs. If the BCR is smaller than 1.0, the investment should be rejected since the cost of the investment outweigh the revenue. (PMBOK 2017).

$$BCR = \frac{/DCF\ [benefits]/}{/DCF[costs]/}$$

Land expectation value (LEV), which is used interchangeably with Soil expectation value (SEV), or Bare land value (BLV), is deemed as one of the most important concepts in timber management. It is viewed as a measure of discounted all future net value from a given land, being estimated by maximizing the value of capital (Zhang & Majumdar 2013). A study by Phimmavong et al. (2019) define LEV as '**the present value of the projected costs and benefits over an infinite time horizon and it provides an estimate of the value of land in perpetual timber production'**. LEV is often referred to as the Faustmann's formular (Straka & Bullard 1996):

$$LEV = \frac{NFV}{(1+i)^t - 1}$$

Of which, NFV is the net future value of one timber rotation, t is the length of timber rotation, and r is the discount rate. According to Brealey et al. (2011), NFV is calculated by the formula:

$$NFV = NPV \times (1 + r)^t$$

As stated by Phimmavong et al. (2019), NPV and LEV are appropriate method when land appears as the most limiting factor of production.

2.3 Theoretical framework

The ultimate goal of a theoretical framework is to broadly depict the structure and content of the study, diminishing its complex reality. The context of the study incorporates the overview of Acacia plantation and forest certification in Vietnam. The governance of Acacia value chain is described, followed by the baseline conditions of smallholder farmers that are built upon the livelihood assets. Vulnerability is used to inspect the external environment in which smallholders exist. Meanwhile, the institutional context shapes the structure of the value chain, the baseline conditions, as well as the implementation of this scheme. Upgrading strategies available to smallholders combined with market-based instruments perspectives reveal timber certification with its competitive advantages, as a feasible mean to improve farmers' livelihoods. Four scenarios are built up to examine costs and promising benefits offered for small plantation growers when participating in the PEFC group certification. **Figure 3** provides a descriptive structure of the thesis.

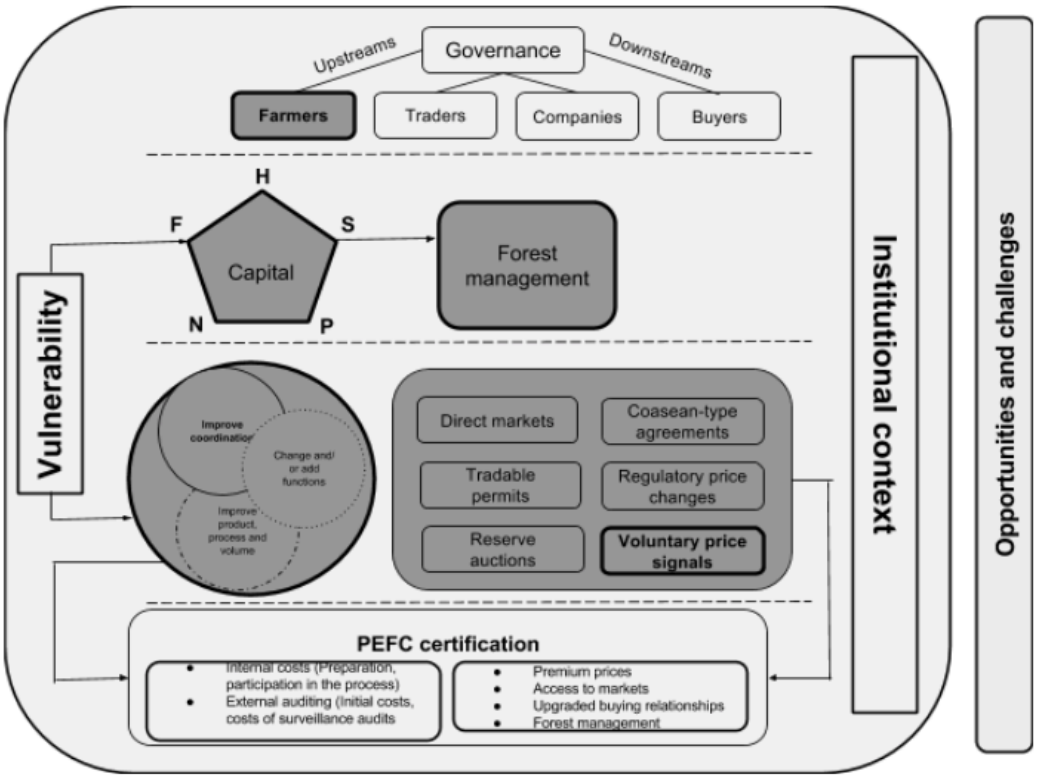

Figure 3. Theoretical framework of the study

3 Context of the study

3.1 Acacia Plantations in Vietnam

Vietnam is endowed with valuable, productive and ecologically unique forests. The national forestry sector over last decades has passed through various stages of development, some of which witnessed severe damages due to the widespread herbicide use during the Vietnam War, and unsustainable logging and land – use practices (Tran et al. 2014). After dropping from 43% to 27% in the period between 1943 and 1990, the GoV has taken concerted actions to rehabilitate the country's forest cover, central to which is to increase newly established plantations in production forest (Pistorius et al. 2016). At present, the area of planted forest in Vietnam is above 4.1 mha, accounting for nearly 29% of the total forest area (World Bank 2019), two-thirds of which is managed by smallholders (Marasenin et al. 2017b). On average, the plantation area increases at a generally fast speed of approximately 150,000 to 200,000 ha annually (Tran & To 2013).

To date, plantation forestry is not only substantially benefiting tree-farmers but also contributing to the domestic industry that is successfully operating in a globally competitive environment (Laity et al. 2016, Midley et al. 2017, Nambiar et al. 2015, 2019).

With its origins in northern Australia and Papua New Guinea, Acacia is a fast-growing leguminous tree species, being introduced to southern Vietnam in the 1960s and to the north of Vietnam in the early 1980s. Acacia hybrid that is a naturally occurring hybrid of A. *mangium* × A. *auriculiforms* has been predominant in terms of both areas planted and wood produced in Vietnam during the past two decades. However, a majority of Acacia plantation is often managed in short-rotation for producing woodchip, usually between 5 to 6 years. In some cases, smallholders are growing hybrids under a 'low input' regime and cutting is even done at the age of 4, mainly because they cannot afford to have funds tied up in forestry for longer than this. The popularity of Acacia timber in the pulp and paper industry is due to its higher pulping potential that makes paper produced from it have better mechanical strength. (Harwood & Nambiar 2014, Nambiar et al. 2014a,b, Tran et al. 2014).

Presently, it is estimated that Vietnam has about 1.2 mha of Acacia plantation, of which clonal Acacia hybrid accounts for over 500,000 ha, tripling from 400,000 ha a decade ago. More than half of Acacia plantation is owned and managed by about 300,000 smallholder farmers with small landholdings of less than 5 ha, creating around 90,000 full-time jobs, mostly in rural areas. (Nambiar 2015; Harwood et al. 2017). On the contrary, there is no consistent data on the volume of Acacia timber due to uncertain data from small woodlot owners. Growth rates of Acacia hybrid vary widely in Vietnam from 10 to 25 $m^3\ y^{-1}\ ha^{-1}$, depending on genetic stock, site conditions, and management (Nambiar et al. 2014, Harwood et al. 2017). A study by Sein & Mitlöhner (2011) shows a volume increment of 20.9 $m^3\ y^{-1}\ ha^{-1}$ for a plantation with a density of 2166 trees ha^{-1}. Meanwhile, Tran et al. (2014) indicate a more optimistic result of 28.7 ± 5.9 $m^3\ y^{-1}\ ha^{-1}$, given a density of 1456 ± 542, and 5 year-plantation at the second or third rotation. However, at least 23 million m^3 is conservatively estimated by assuming all of Vietnam's acacia harvest is exported as woodchip (Midgley et al. 2017).

According to Pistorius et al. (2016), there are distinct reasons for the popularity of Acacia hybrid in Vietnam, including simple technology requirements for production, well-established and functioning value chain particularly woodchip, and suitability to plant even on heavily degraded soils and barren lands. Scientific experiments prove that Acacia is capable of improving soil fertility by fixing atmospheric nitrogen and increasing soil carbon (Harwood & Nambiar 2014). However, the development of Acacia plantation is challenged, starting from low and gradually declining economic performance, which is counterproductive for their contribution to rural development and poverty alleviation. Secondly, short-rotation are far beyond the potential of sequestrating carbon for ecosystem services. More importantly, replacing native tree species by Acacia hybrids will negatively impact the resilience, enhanced biodiversity and future provision of vital ecosystem services. (Pistorius et al. 2016).

3.2 Forest certification in nutshell

Impacts of forest certification are multidimensional, affecting directly to social, economic and environmental settings. There is a long history of standard developing and forest certification in Vietnam since the 1990s with continuous supports from different international development agents. The first move was made in 1998 when the GoV incorporated certification into the sector development plan. At first, the national forest management standard was developed in compliance with the FSC certification. (Vu et al. 2017). Even though the number of FM and CoC certificates has consistently increased since 2006 (**Figure 4**), the overall results are still limited, especially when it comes to the smallholder farmers (Hoang et al. 2019). Until the end of 2019, Vietnam has only 212,610 ha of FSC FM certification (**Table 4**). Although certified forest areas have rapidly increased since 2013, these figures are relatively modest compared to the country's total forest area of above 14 mha (MARD 2017).

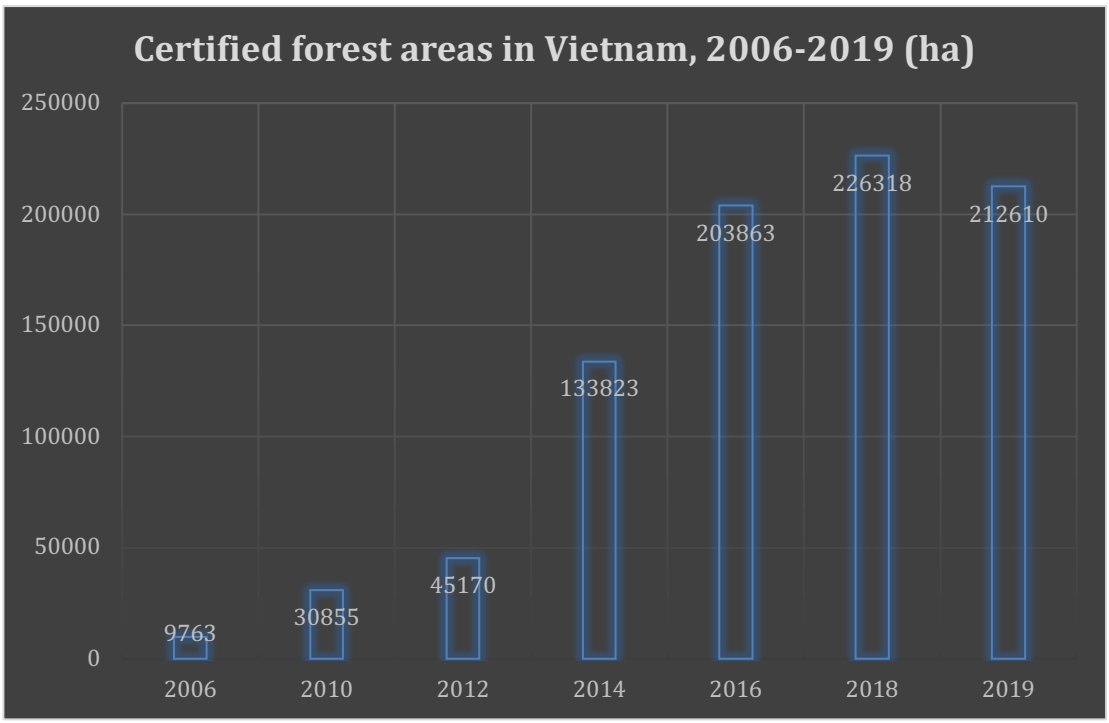

Figure 4. Expansion of certified forest areas in Vietnam, 2006-2019 (Ho 2020)

Over the past decades, forest and forestry policy has been formulated to encompass the principles of SFM with a range of policy drivers that promote certification. The Vietnam Forestry Development Strategy 2006-2020 approved in 2007 has recognized SFM and forest certification among the ultimate objectives of the sector. The Strategy sets an optimistic target to be achieved by 2020 whereby at least 500,000 ha of production forest, of which 350,000 ha are planted forests and 150,000 ha are natural forests, will be certified (GoV 2007). After more than 10 years of struggling with FSC certification, the GoV approved the establishment of the Vietnam Forest Certification System (VFCS) in 2016, showing an ambition of taking national ownership of certification. Developed in accordance with PEFC requirements, this scheme is important in promoting SFM, and developing the market for legal timber and clean raw materials for the national wood and forest product processing sectors and exports. (Vu et al. 2017). The Vietnam Forest Certification Office (VFCO) was established in January 2019, and the Vietnam official joined PEFC certification in May 2019 (PEFC 2019). The current situation of both FSC and PEFC certification is summarized in **Table 4**.

Table 3. Timber certification in the world and Vietnam (FSC 2020b; PEFC 2020)

	FSC				PEFC			
	FM		CoC		FM		CoC	
	Area (ha)	%	No of certificates	%	Area (ha)	%	Number of certificates	%
World	213,491,083		44,041		319,450,518		12,163	
Vietnam	217,057	0.1	908	2.0	0	0.0	11	0.09

To date, all certified areas in Vietnam complies with FSC FM standards. This figure is relatively small compared with not only the total global FSC certified areas (0.1%) but also the country's forest area (1.5%).

3.3 Group forest certification

Group certification designed to enhance the inclusion of small woodlot owners in the forest certification systems by allowing a group of forest owners to join together under a single certificate, and enabling a cost-sharing mechanism among the members (Boakye-Danquah & Reed 2019). The certificate holder is often called the group entity that manages the group of forest management units. Group forest certification is especially appropriate in Vietnam, where smallholder farmers own and manage nearly a half of the country's total plantation (Hoang et al. 2019). The World-Wide Fund (hereinafter WWF) and IKEA group are the pioneers jointly encouraging group forest certification with the first pilot model in Quang Tri in 2007 (Hoang et al. 2019). Group forest certification has been then extended national wide, for example, Thua Thien Hue province in the central, and Yen Bai and Bac Can province in the north.

3.3.1 Group forest certification in Quang Tri province

The group forest certification in Quang Tri is recognized as the first initiative on household certification in Vietnam. The initiative started in 2007 by the Swiss State Secretariat for Economic Affairs (SECO) and WWF, aiming to support plantation smallholders in pursuing FSC certification. The Quang Tri FSC Group Certification (hereinafter the Quang Tri Group), was awarded FSC certificate in 2010. At that time, there was a modest area of 350 ha and 118 participating households (Auer 2010). On 2015,

an area of 1,392.4 ha was re-certified. (To et al. 2018). The certified forest area is continuously increasing, expanding to a total of 1,876 ha as of November 2017. However, over a 10-year effort, the results gained are relatively minimal.

Scansia Pacific Co., Ltd (hereinafter Scansia Pacific), the main supplier of IKEA in Vietnam with three processing factories across the country, is one of the key contributors for the success of group forest certification in Quang Tri province. Until 2017, the company provided jobs for approximately 2,000 employees and exported a value of €27 million, of which €21.14 million went to IKEA. Besides committing to purchase certified timber at the price of at least 15-18% higher than the market price, Scansia Pacific has partly sponsored the assessment costs and provided loans of up to EUR150 -1 y -1 with interest rates of less than 0.2% compared to commercial bank for smallholders to produce sawlogs. The loan has been available from the sixth year onward. (Nguyen et al. 2018).

In this model, the Quang Tri Group acts as the group entity with 29 sub-associations at the village level. It is a civil-socio association, and the group managers are responsible for setting up the structure of the association. Even though being recognized as a cost-effective approach, the financial sustainability of this model is questionable since all the costs associated with the certification depended on external funding (Hoang et al. 2015 a,b), and the capacity of the group is relatively weak (Flanagan et al. 2019a).

3.3.2 Group certification in Yen Bai province

In 2015, an FSC group certification was initiated in Yen Bai by Nam Dinh Forest Products JSC (hereinafter NAFACO) that is one of the largest partners of IKEA in Vietnam. The provincial farmer s' union was first nominated as the group entity. However, the role was quickly turned over to the Yen Binh Association of Smallholder Forest Certification Group, which are responsible for attaining and maintaining the group certificate. There is a total of five communes involved in this group certification, of which heads of the village and communal farmer union are the sub-group managers at the local level. Multiple external supports have been provided for the project, including Forest and Farm Facility programme, which is a partnership between the Food and Agriculture Organization of the United Nations (FAO), the Institute for Environment and Development (IIED), the

International Union for Conservation of Nature (IUCN), and AgriCord. This model was certified in late 2016 for a group of 494 households with a plantation area of 1,737 ha (Nguyen et al. 2018). Certified timber is sold to NAFOCO at an agreed price premium of 10%. The company also purchase small-diameter timber for EUR5.5 higher than average market price. An additional freight cost of EUR4 per m^3 is paid for transporting logs to the closest CoC sawmill. Besides covering audit cost, NAFOCO paid EUR4,400 for office equipment to be used by the groups' representative. In return, members of the association had to leave 10% of increased benefits from timber sales to maintain the group operation. (Vu et al. 2017, Nguyen et al. 2018).

3.3.3 Group forest certification in Bac Can province

Bac Can province is recognized with the newest FSC group forest certification in Vietnam. The project began in March 2017 and has been supported by the United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (UN-REDD Programme), and Woodland Company, a supplier of IKEA in the north of Vietnam. An area of 921 ha was certified by the end of 2018 for a group of 322 households (Le 2019). Even though the project has newly been developed, some challenges have been identified including unclear group entity and group structure, financial sustainability, the small scale of group forests coupled with a large number of forest owners, and low plantation productivity (Vu et al. 2017).

3.3.4 Group forest certification in Thua Thien Hue province

The first FSC group certification in Thua Thien Hue province inherits the success of the model in Quang Tri. In this model, Thua Thien Hue Forest Owner Sustainable Association, a professional society association, is the group entity. The group managers are assigned from the provincial to the commune and village levels. The root of this association can be traced back to the **'Forest Sector Development Project'** operated by the World Bank (hereinafter WB3) in the period from 2005 to 2013. The operation of this association was additionally supported by the project **'Promoting Responsible Management and Restoration in Vietnam'** that was run by WWF and IKEA, and Scansia Pacific company. This forest group was firstly certified in 2012 for 215.8 ha with

42 households. As of 2016, there were 259 households participating in the association with an area of 986.25 ha. The target to the end of 2020 is to have 2,500 households with an area of 6,000 ha. (Vu et al. 2017).

Scansia Pacific, is also playing a pivotal role for the expansion of FSC certification in the Thua Thien Hue province through providing loan for households to produce large sawlogs. In this model, farmers can borrow €445 ha $^{-1}$ y $^{-1}$ for 3 years, starting from the fifth year of rotation. Money is paid as a lump sum upon the agreement. The interest rate is 0.2% lower than commercial banks, and loans are paid back upon timber sales. Under the agreement, Scansia Pacific commits to purchase all sawlogs with a diameter over 10cm for 10-15% higher than uncertified timber. Although still being implemented at a small scale, this model has effectively supported the transition to the long-rotation plantation. However, similarly to the Quang Tri model, members have to contribute 5% of the extra profit from certified timber to maintain the association, of which 80% is allocated at commune/village level, and the rest will be sent to association at the provincial level. (Vu et al. 2017, Nguyen et al. 2018)

A close connection with IKEA group can be identified from the FSC group certification models**.** In-depth research by Nguyen et al. (2018) has shown shared benefits for all participants. IKEA can ensure the legality of the timber; wood processors can receive long-term standing orders from IKEA. Meanwhile, smallholders benefit from access to a loan with low interest and better price for certified wood. The IKEA linkage is depicted in **Figure 5.**

However, the linkage is also posing some challenges related to smallholders and resulting in the failure of the collaboration as a whole. Currently, processing companies only purchase high-quality timber with a diameter above 13cm, which often require a growing cycle of 8 to 12 years. Small producers are still struggling in finding a market for smaller logs and branches that are sold at lower prices. Also, the duration is assumed too risky for vulnerable smallholders who are often seen without financial security and bearing high threat of catastrophe. Contract violation and withdrawal from the agreement are thus quite common. More importantly, the FSC standard requirements are too complicated for

poorly educated farmers. Therefore, the sustainability of the linkage can be ensured only when these issues are addressed. (Vu et al. 2016, Vu et al. 2017, Nguyen et al. 2018).

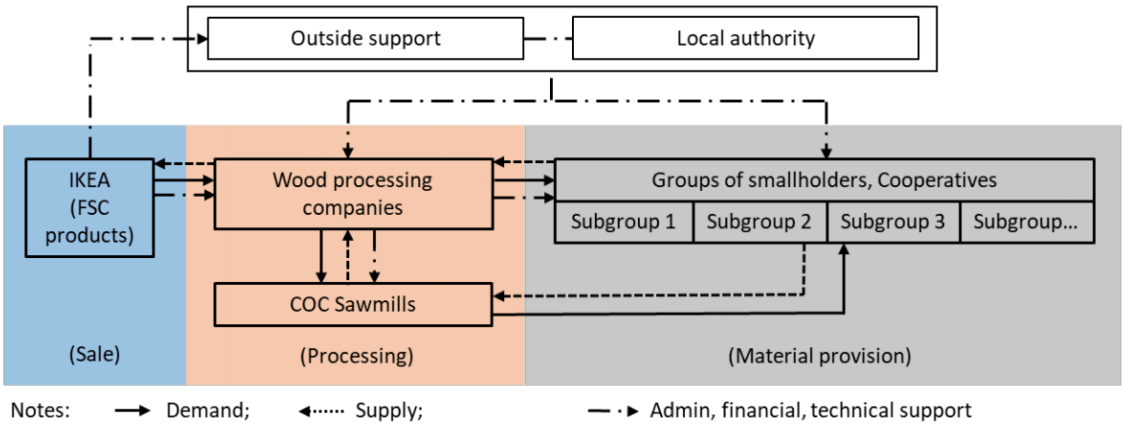

Figure 5. IKEA linkage model (Nguyen et al. 2018)

Besides, a new initiative of the group certification has been developed with financial and technical support from FFD, following PEFC certification standards. In this model, the cooperative alliance, as a socio-economic organization, is the group entity and the cooperatives at commune level are sub-groups. By taking advantages of the cooperative structure that stretches from the national to commune level, this model has potential in reducing the administrative complexity and transaction costs through utilizing existing cooperative staffs, extension support centres and support funds.

In relation to the similarity of the group certifications in Vietnam, including the PEFC group certification, there has witnessed a dependence on financial and technical support from international development agents. External assistance is vital in the context of Vietnam, where there are limited capability and understanding of forest certification. However, a heavy reliance on funding can negatively affect the continuity and financial sustainability of group certification. Secondly, on the complexity and the scale of the group, the organizational structure of a group could be simple or complicated, but all well managed. In essence, the current group entities are based on the structure of a cooperative alliance and an association representing smallholder farmers, which are presumably active and effective ways to manage fractioned individual forest holdings in one or another way. With their own pros and cons, these two forms have helped strengthen the operation of

household certification groups, as well as connect their members with other actors in the value chain. (Vu et al. 2017).

3.4 Costs and benefits of forest certification

3.4.1 Costs of forest certification

Cost of certification consists of different elements, and are often separated into direct and indirect costs (Nussbam & Simula, 2005, Chen et al. 2010). As stated by Deusen et al. (2010), the costs of certification are often observed quicker than the socio-economic benefits. Direct costs refer to initial investment and ongoing costs, while indirect costs derive from restrictions on forest management options that are beyond legal requirements (Deusen et al. 2010). Cubbage et al. (2009) name different components of certification costs including costs of internal audit and preparation, external audit, ongoing certification preparation, community education and support grants, changes required to get and maintain certifications, and administrative costs related to membership. In Vietnam, an internal audit is often performed by domestic auditors with reasonable fees, while an external audit is carried by foreign auditors, who are very costly. In reality, to quantify the exact costs of certification is challenging and complex work. This is partly attributable to different external funding for technical and operational support, which cannot be counted.

As reported by Hoang et al. (2019), the majority of certification costs incur in the first year of every five years. Initial investment costs, which is the second greatest segment of the total certification cost, are made of different components such as getting proof of forest ownership and government approval, building and strengthening group entity, developing a forest management plan, etc. Flanagan et al. (2020) estimate that the initial costs of a medium-size plantation, which is 2000-5000 ha, are on average of \$600 ha $^{-1}$.

In the case of PEFC certification, the initial investment cost for adding one cooperative into the group certification is estimated at €2,200 (Laity et al. 2016). The total forestland of each cooperative varies from 200 ha up to over 1000 ha, making the initial cost per ha range from €2.2 to €11. However, Laity et al. (2016) also note a possibly higher number

depending on the conditions of the cooperative. **Table 4** specifies different components included:

Table 4. Estimated establishment costs of PEFC group certification (Laity et al. 2016)

Awareness raising workshop	254
Technical trainings on:	
Cooperative ToT for farmers	169
Silviculture techniques	169
Harvesting	169
Forest management	169
Forest protection	169
Training cooperative in conducing workplan	169
Conducting Business Cooperative Management Plan	127
Establishing plantation models	339
One year monitoring	127
Facilitating wood sales	339
TOTAL	**2200**

On-going costs are commonly referred to costs of maintaining certification and encompass different components including the cost of improving management practices, keeping records of activities, restoration and rehabilitation, establishing and protecting conserved areas, annual compliance audits, etc. The annual on-going cost is reported to vary from \$17 to \$40 ha $^{-1}$ depending on the size of the forest properties. The cost for a small to mid-sized plantation (up to 5,000 ha) is \$10,000. Flanagan et al. (2020). The audit costs of FSC group certification in Quang Tri were estimated at \$8.62 ha $^{-1}$ y $^{-1}$ over four years (Nguyen et al. 2018).

Annual audit costs account for the majority of the total cost. Laity et al. (2016) give recent examples of the costs associated with FSC certification. The cost of an initial assessment of 10,000 ha is up to \$40,000, followed by \$20,000 for the first two annual audits. In Phu Tho province, an amount of \$70,000 is paid for an assessment for 2,100 ha, while the Vietnam Rubber Cooperation spent \$200,000 for assessing a total area of 11,700ha. These costs often decrease over time, as periodic audits and re-assessments are less expensive than the initial assessment.

Opportunity costs, which are sometimes referred to as costs of environmental responsibility, vary and are often the most difficult to quantify. Flanagan et al. (2020) listed different types of opportunity costs such as loss in production capacity due to

requirements of buffers or conservation areas or loss of income associated with administrative requirements. Hoang et al. (2019) consider compliance cost as opportunity cost, which can be calculated by multiplying the number of working days with the hourly wage.

Costs and complexities of certification are widely perceived as the major hurdle for Vietnamese smallholder farmers to achieve forest certification (Midley et al. 2017, Nambiar 2019). Flanagan et al. (2019a) believe that the initial investment and annual costs are excessively high and cannot fully be covered by smallholder farmers without external support. With an estimate of at least 5,000 ha to make the costs to a reasonable level, the adoption of forest certification systems alone is believed not able to enhance the profitability of smallholders (Flanagan & Laity 2015, Flanagan et al. 2019a).

In practice, there is a lack of comprehensive studies on the costs of certification. One interviewee agreed with an argument by elucidating the main challenges preventing an accurate quantification of the total cost: fragmentation and limited access to the available information on the actual costs. This can be attributed to the dependence on international development agencies for getting timber certified. To date, there is only a study that gives a full picture of the actual cost of certification in Vietnam (Hoang et al. 2019). The components of certification costs are drawn in **Table 5**. The actual costs of certification are surprisingly lower than often mentioned in previous studies.

Table 5. Summary of all FSC related costs in the period 2010-2016 in Quang Tri province (Hoang et al. 2019)

Cost	**Year**						
	2010	2011	2012	2013	2014	2015	2016
Preparation cost (EUR)	2150	2150	2150	2150	2150	2150	2150
Audit cost (EUR)	6755	3675	3675	3675	5000	7648	5416
Compliance cost (EUR)	113	75	75	75	45	45	248
TOTAL COST (EUR)	9018	5900	5900	5900	7195	9843	7814
Certified area (ha)	318	581	571	892	925	1392	1722
Annual cost per ha (EUR/ha)	28.36	10.15	10.33	6.61	7.78	7.07	4.54

It is clearly deduced from **Table 6** that the costs of certification are consistently reduced as a result of an increase in the plantation area. In 2016, the actual cost was only EUR4.54. Besides, the actual cost can also be lessened by adding more members to the group entity.

3.4.2 Benefits of forest certification

The evidence for positive aspects of certification, of which there are many, is clear. Scott (2015) sees certification as **'one of the brightest bright shining lines of the sustainability movement'**, promoting better practices in environmental, economic and social management. In recent years, researchers have shown an increased interest in the environmental and social impacts of forest certification. A study by Miteva et al. (2015) recognizes the contribution of forest certification in increased forest cover, improved air pollution, and reduced number of malnourished people. Adopting forest certification can also give rise to carbon density in above-ground vegetation, and mammal species richness, especially of endangered species (Imai et al. 2009, Lewin et al. 2019). However, Ven and Cashore (2018) suppose that scientific evidence of social and environmental impacts is still mixed and inconclusive. In relation to economic benefits of forest certification, Toppinen et al. (2013) add strengthened strategic organizational capabilities, enhanced reputation resulting in customer loyalty or increased market shares, and price premiums. Forest certification generally offers assurances of 'sustainability' to customers; however, it is not easy to discover precisely what parameters of sustainability are measured during audits. Having complete researches about the benefits is a challenging task owing to the complexity and expensiveness of the existing systems that are often run by supporting projects resisting full disclosure and transparency (Flanagan et al. 2019a).

The benefits associated with forest certification, either FSC or PEFC, are divided into direct and indirect benefits (Nussbaum & Simula, 2005) and can be accessed in monetary and non-monetary terms. Price premium, which is defined as the difference in price between a certified and an identical non-certified product (Chen et al. 2010), is the most appealing factor to the increased participation of smallholder farmers in forest certification scheme. It is ranked as the first place by all of the interviewed farmers for the question about the perceived benefits of forest certification. In Vietnam, FSC-certified sawlogs often are purchased at a 10% -18% higher price (Nguyen et al. 2018, Flanagan et al. 2020), creating extra revenue to smallholder farmers who keep their plantation over seven years. Exceptionally, a price premium of 19% - 22% was found in Dang Nang Province (Hoang

et al. 2015a). Although income alone is insufficient as a criterion of poverty, increased income is relevant to the economic sustainability of the household (Warner 2000).

The controversy about scientific evidence for the economic benefits of forest certification has raged unabated since it was firstly introduced in Vietnam. Flanagan et al. (2019a) claim that the economic benefits obtained by timber certification are still ambiguous, uncertain, and limited to small groups with external support. They present their argument through a further discussion of the FSC group certification in Quang Tri. In this model, the sawlogs price of FSC and non-FSC certified at the mill gate were €65/m^3 and €55/m^3, respectively, creating a price premium of 15%. However, if assuming 1ha plantation with a rotation of 7 years produces 100 tons that is divided 40% to sawlogs and 60% to woodchip, and a prevailing woodchip price was €45/m^3, the price premium was reduced to 6.8%. With a further 2% deduction for maintaining the group entity, the net benefit is thus less than 5%. Most importantly, this figure does not include the cost of getting timber certified, resulting in a much-debated question whether the economic return is sufficient to offset the associated cost of certification. A recent study by Iwanaga et al. (2019) assume increased income predominantly stems from the rise in timber prices for sawlogs rather than premiums. It is not always an incentive for small woodlot owners since a price increase of 20-25% can only be visible after 10 years. On the contrary, there are also many studies confirming the economic benefits of forest certification for Vietnamese smallholders (Auer 2012, Hoang et al. 2015a,b, Maraseni et al. 2017, Hoang et al. 2019).

4 Data and methodology

4.1 Qualitative method

Qualitative research often refers to empirical research, where the data are not in the form of numbers (Punch, 2013). Aiming to answer the questions **'How'** or **'What'**, this interpretive methodology explores and interprets the meaning individuals or groups ascribe to a social or human problem (Ghauri et al. 2005; Creswell 2013). Qualitative research encompasses several methods that are classified differently among authors. Still, these methods typically count on text and image data, having unique steps in data analysis, and drawing on diverse designs (Creswell 2013). Smith and Bowers-Brown (2010)

highlight the most common methods, including semi-structured interviews, focus groups, unstructured interviews, participant observation/observation, diaries and documentary. With an explorative purpose, this thesis is methodologically built upon the qualitative research method.

4.2 Triangulation in qualitative research

As reckoned by Rothbauer (2012), the concept of triangulation in qualitative research is similar to the term 'multimethod approach to data collection and data analysis'. This approach is sometimes used for sources of data. The underlying idea behind the concept is **'the phenomena under study can be understood best when approached with a variety or a combination of research methods'**. Indeed, in qualitative inquiry, triangulation is deemed as an effective strategy that enables researchers to identify, explore and understand the units of study from different angles, thereby strengthening their findings and enriching their interpretations.

4.2.1 Data collection

Data collection is simply understood as a process of gathering and measuring information on variables of interest, of which ensuring the accuracy and appropriation of data is crucial. A common way to enhance the rigour and reliability of the research is through combining multiple accurate sources rather than a single reference. Creswell (2013) defines four basic types of data collection procedures: qualitative observation, qualitative interviews, qualitative documents, and qualitative audio and visual materials. In this research, different sources of data are collected respectively.

In this study, data collection was designed to capture the perceptions of respondents on different aspects of PEFC group certification. Primary data was firstly collected from focus group discussions (hereinafter FGD) with representatives from three study cooperatives. During FGDs, respondents were asked to share their experiences and attitudes towards a set of issues regarding organizational structure and operation of the cooperative, current stages of forestry and timber certification, market, and financing. In practice, FGD was proven as a useful tool for exploratory work at the beginning of the

study, as a method in their own right or as a complementary approach to other methods. A total of three FGDs that involved 6 -10 people and lasted for 90 to 120 minutes was held in three cooperatives. Participants varied from cooperative spokespeople, farmers, forestry experts to local traders.

Key informant interviews were done with different groups including farmers, traders, wood chip factories and wood processing company, and governmental institutions and other NGOs. Semi-structured interviews, as a form of qualitative interviews, which embrace a broad spectrum of participants, was used to get a largely unbiased view of the different stakeholder insights and provide primary data for the research. The chosen interviewees of each group were both similar and diverse enough for comparison and generalization, contributing to the insurance of the sample quality. The connection between groups of respondents are drawn on **Figure 6**:

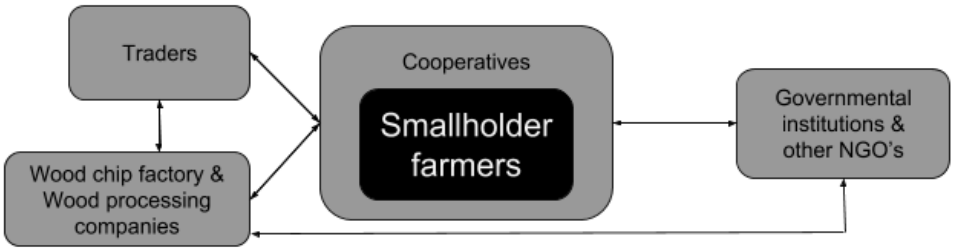

Figure 6. Connection between groups of respondents

In the semi-structured interviews, five sets of questionnaire were prepared for five informant groups: smallholder farmers, middlemen, timber processors, related institutions and NGOs, and those who participate in the FSC forest certification. All participants in a group were asked the same questions, usually in roughly the same order. For example, the questionnaire for smallholders revolved around their background, the role of forestry in their livelihoods, their perception of SFM and timber certification, market and financing issues. These questions aimed to quantify their livelihood sources, as well as the contribution of planted forests to the household economy. Test runs were done for each informant group to ensure the success of the interviews. Supposedly providing a broader scope of observation and increasing the authenticity and credibility of the data, almost all of the interviews were held face-to-face. Only one telephone interview was done with a

group leader of FSC certification. There were 84 farmers taking part in the interviewing. Besides, interviews were arranged with 9 traders, 13 woodchip and furniture processing companies, and 17 leaders and experts from government organizations, farmers' organizations, associations, and NGOs at both national and local levels. All interviews took part in 60 minutes on average, being recorded in audio with the agreement of respondents. The reaction of interviewees was cautiously observed during the interviewing process.

The data collection was applying the snowball sampling method, which is sometimes used interchangeably with chain sampling, chain-referral sampling, referral sampling. Snowball sampling is a nonprobability sampling technique that offers a practical way to obtain the goals of purposive sampling when locating members of the population of interest is difficult. Kimmich et al. (2009) deem snowball sampling as the fastest method to identify potential stakeholders for the study. Snowball sampling often uses a small pool of initial informants, typically through interviewing a set of research participants, to nominate, through their social networks, other participants who meet the eligibility criteria and could potentially contribute to the study (Morgan 2008). In this study, the interviewing process that began with cooperatives virtually connected the researcher with smallholder farmers, from whom potential traders and companies for interviews were identified. Besides gathering sufficient data for the research, this method helped estimate the needed sample size by indicating the end of the interviewing process when there was no more new information gained from respondents.

Structured observation, which entails the collection of data according to a set of predefined rules and procedures deriving from the study's objectives, was also employed to capture the management of plantation in the study area. In this thesis, a set of data included the type of species, silvicultural techniques, protection or forest regulation. This method involved the author's direct observation of the settings without interaction with participants. (McKechnie 2008).

Data for this study was also obtained from secondary sources, including journal articles, books, published and unpublished reports from research institutions. Smith and Bowers-

Brown (2010) see secondary data as the systematic scrutiny of the content of documents to identify patterns of change or development on specific issues. This source of data not only help build a background and framework for the research but also consolidate the conclusions drawn from the primary data.

4.2.2 Data analysis

Flick (2014) recognize data analysis as the main step in qualitative research to which all other steps are subordinated. The analysis of qualitative data often comes after the study field is found, types of sampling are decided, data is collected, recorded and elaborated. Also revealed by Flick (2014), data should be analyzed in a decisive way forming the outcomes of the research regardless of types of data.

In this research, ethnography analysis was proceeded deductively, based on the pre-defined theoretical background and framework, and following Creswell's six-step process (2003). First and foremost, primary data obtained from FGDs, interviews, observations and secondary sources were organized and prepared for the analytical process. In this time-consuming step, notes and recorded audio of interviews conducted in Vietnamese were transcribed into English. Secondly, data were simplified, arranged and displayed in Excel tables, from which the general ideas, different and common phenomenon among respondents could be captured. Each respondent was denominated under a separate code that helped facilitate the citation and to protect their identities. Unnecessary data were then eliminated. Thirdly, data were classified into rational categories, which were based on pre-set issues or newly generated from the fieldwork, for the following step, where the description of each information category was generated. In the fifth stage, findings from identified categories were displayed in different forms, including narrative passage, tables and figures. The final phase of the analytical process focused on interpreting data to find the relationship within and between the groups of information. In other words, findings for the research questions were presented. **Table 6** demonstrates the dispersion of the respondents:

Table 6. List of respondents

ID	Position	Organization	Location
E01	Specialist	Government organization	Hanoi
E02	Vice president	Farmer's organization	Hanoi
E03	Director	Research institute	Hanoi
E04	Vice rector	Rearch institute	Hanoi
E05	Director	Rearch institute, University	TTH
E06	Country manager	NGO	Laos
E07	Deputy Manager	Provincial government organization	TTH
E08	Vice director	Provincial government organization	TTH
E09	Officier	Provincial government organization	TTH
E10	Vice director	Provincial farmer's organization	TTH
E11	Country manager	NGO	HCM City
E12	Project manager	Timber producers' association	HCM City
E13	Vice president	Timber producers' association	HCM City
E14	Director	Rearch institute	Hanoi
E15	Vice director	Rearch institute	Hanoi
E16	Country manager	NGO	Hanoi
E17	Chief of secretariat	Timber and forest products' association	Hanoi
F01-F84	Smallholder farmers		TTH
GGD1-3	Various positions	Three study cooperatives	TTH
P01	Provincial manager	Wood processing company	TTH
P02	Manager	Wood processing company	TTH
P03	Director	Wood processing company	TTH
P04	Director	Woodchip company	TTH
P05	Manager	Woodchip company	TTH
P06	Manager	Woodchip company	TTH
P07	Director	Wood purchasing and processing company	TTH
P08	Director	Wood processing company	HCM City
P09	Sales manager	Wood processing company	Binh Duong
P10	Manager	Wood processing company	Binh Duong
P11	Manager	Wood processing company	Binh Duong
P12	Manager	Wood processing company	Binh Duong
P13	Country manager	Wood processing company	HCM City
T01-T07	Trader		TTH
T08	Trader		HCM City

4.3 Study sites

Thua Thien Hue province (hereafter TTH province) is not well known for the production of wooden products. There are several reasons for choosing this province as the study area, starting from the existence of both FSC and PEFC group certification. Also, this province is bordered by Quang Tri Province, where the first FSC Group scheme was established for smallholding plantation holders in Vietnam and Southeast Asia. Lewin et al. (2019) view this province as **'an encouraging example of how a better appreciation of the role of certification in achieving high-level policy goals and targets has increased accessibility of certification'**. Indeed, TTH province is a good site for a better grasp of the forest certification evolution at the local level.

TTH province is located on the central coast of Vietnam, between $106^{\circ}30'49.47''$ E and $15^{\circ}59'40.11''$ N, with a total land area of 503,320 ha, and nine administrative units, including Hue City, Huong Thuy Town, Huong Tra Town and other six districts namely Phong Dien, Quang Dien, Phu Vang, Phu Loc, A Luoi, and Nam Dong. Having affected by the tropical monsoon climate, the province has a dry season and a heavy monsoon season. The mean annual temperature is 25ºC; the annual average precipitation is 2540 mm; and the mean air humidity is 86.8%. The lowest and highest mean monthly temperatures are 19.4 ºC in January and 29.3ºC in June, respectively. The topography of TTH Province is diverse, with high mountainous regions in the west and flatter, sandy coastal areas to the east. Heavy rainfall in a short period coupled with steep catchments poses significant disaster risks for TTH province, such as severe flooding that results in high rates of soil erosion and landslides. (Tran et al. 2014, Paudyal et al. 2020). In this province, planted forests areas doubled from 1999 to 2008 with about 5,000 ha newly planted annually by the government, donors, and household farmers (FFD 2016).

Historically, a large share of the provincial forests and forestlands had become extensively deforested and the landscape severely degraded by the 1980s, making the vegetation dominated by *Imperata* grasslands and scrub species. The government restoration programmes primarily introducing exotics including Eucalyptus and Acacia species were promoted to halt erosion and return degraded areas to productive use. Acacia hybrid has

turned out to be the dominant species for commercial planting since the late 1990s due to its fast growth rate, complete adaptation to degraded soils, and available markets, particularly pulpwood in a prevailing cutting rotation of about 5 years. (Tran et al. 2014).

Forest covers approximately 57% of the province's area with a total 348,837 ha of forest and forestland. Production forest occupies the largest share, of which almost 71,000 ha are already covered by plantation forestry. Households are managing a total of 24,179 ha, accounting for 34% of the total plantation. (FFD 2016). As obtained from interviews with managers and leaders of FSC group certification in TTH province, as of September 2017, FSC forest certification assessment was carried out for 327 households with a total area of 1,881 ha, making the total number of the household to 613 with an area of 2,832 ha. **Figure 7** illustrates the ownership of planted forests in TTH province, of which smallholder farmers hold the greatest share.

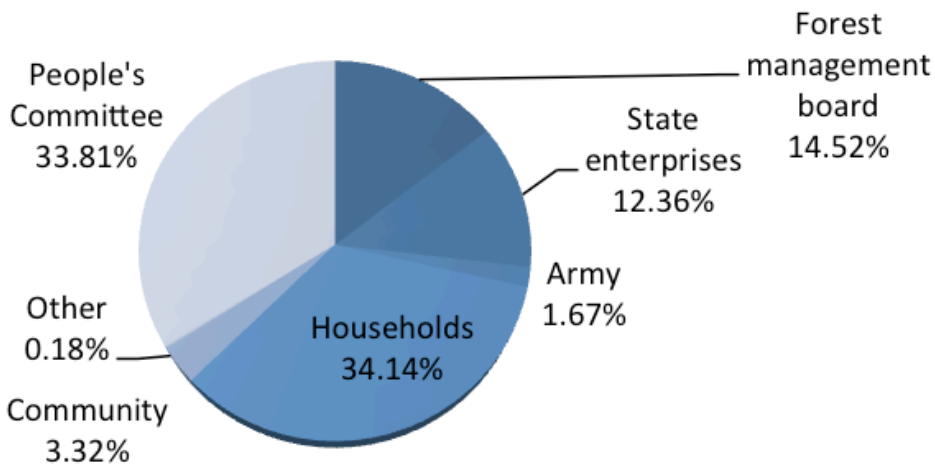

Figure 7. Ownership of planted forests in Thua Thien Hue province in 2016 (FFD 2016)

In TTH province, SFM is considered as a new way to promote the livelihood of local communities. The Department of Agriculture and Rural Development of TTH province indicated during the interview that the current demand of certified sawlogs for furniture production in the province was 20,000 m^3 and it expectedly increased to 40,000 m^3 in the next few years. The province has a plan to expand the areas of large timber plantation to 13,000 ha in the period 2016-2020, of which about 6,000 ha will acquire FSC FM

certification. In practice, many enterprises have come to work with the provincial leaders and offered to purchase all amount of FSC certified timber in the province. The interviewee expected this create jobs and improve the livelihood of smallholder farmers in the study regions. Commenting on the development of the provincial forestry sector in relation to forest certification, one of the leaders said:

- *'Growing large timber in a sustainable way that meets FSC requirements is an indispensable direction to restructure agricultural production and create added value for the province's forestry sector. Smallholder plantation forestry is viewed as an opportunity for provincial forest producers to participate in higher value domestic and international market, improve their livelihood, contribute to social security, and protect the ecological environment'.*

Thua Thien Hue Cooperative Alliance (hereinafter TTHCA), as a member of the Vietnam Cooperative Alliance (VCA), was established in 1995 on the basis of the Cooperative Law. The management board that includes one chairman and two vice chairman through election every five years. Until 2017, TTHCA has a total of 256 cooperatives with 236,000 members, of which 162 cooperatives are working in the field of agriculture and agroforestry. Other 374 cooperative production groups work in different sectors, such as transportation, crafts, etc. The organization contains three divisions, including the general office, policy monitoring division, and cooperative movement division. Additionally, there is a centre for cooperatives and small-and-medium enterprise support. In recent years, TTH province has witnessed a declining rate of labour in agriculture in general and forestry in particular. On average, the percentage of labourers engaged in agricultural activities varies from 30 to 35%. (FFD 2016, TTHCA 2017).

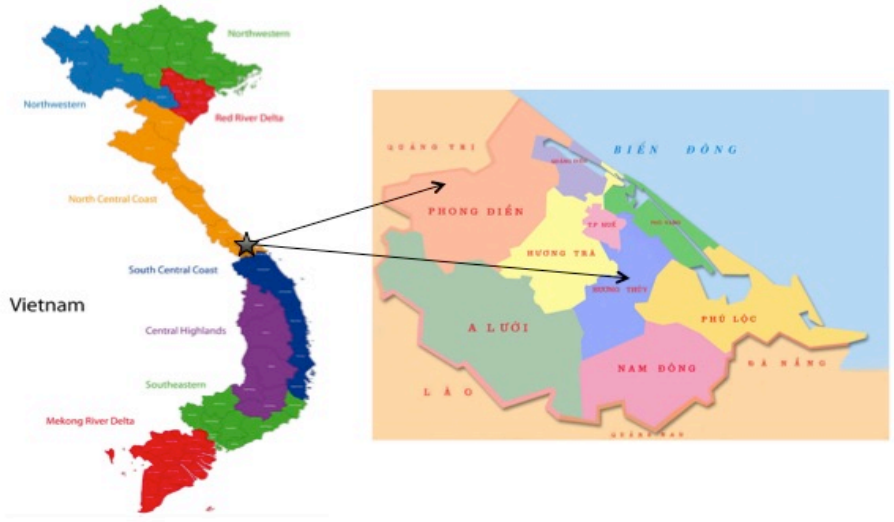

Figure 8. Location of study area

The research is carried out in three cooperatives, namely Hoa My, Thuy Phuong, Phu Bai. Hoa My cooperative is located in Phong Dien district, in the northern part of the province. The other two are positioned in the south, belonging to Huong Thuy town that is more crowded and densely populated (**Figure 8**). The average density per square kilometre of Huong Thuy town and Phong Dien district is 222.3 and 97.3, respectively. Thuy Phuong is the biggest cooperative with nearly 1,100 households, while the size of Phu Bai and Hoa My cooperative are smaller with around 350 members. **Table 7** illustrate the forest ownership of the three cooperatives, of which Hoa My is the only one without cooperative's forest.

Table 7. Forest areas of study cooperatives (FFD 2016)

Cooperative	No of households	Plantation area of farmers (ha)	Plantation area of cooperative (ha)	Land use rights (%)
Hoa My	340	116.5	0	90%
Thuy Phuong	1080	170.6	112	100%
Phu Bai	367	150.2	120	98%

FGD method drew a clear picture of the socio-economic situation, which differs across the three study cooperatives, but also shares fundamental similarities. First of all, all cooperatives are run by an all-male management board that varies from 3 to 5 members.

Secondly, they are economically autonomous with various sources of income, which are mainly from selling agricultural materials and services. Typical services include drainage, soil preparation, in-field traffic, harvesting, husbandry, and crop protection, etc. Phu Bai and Hoa My cooperative have recently benefited from sponsored nurseries that produce seedlings for Acacia plantation. Meanwhile, Thuy Phuong cooperative has essential sources of income from market management and credit and financial services. Only Phu Bai and Thuy Phuong have income from the planted forest, even though the contribution from forest to the annual revenue is limited to 7.5% and 3.4%, respectively. Thirdly, the three cooperatives appear with a strong institutional link and labour provision. All cooperatives maintain a close relationship with other political and social organizations through emulation movements in production, building cultural life in residential areas and others launched by the Fatherland Front. They are well recognized with an essential contribution to national solidarity and socio-economic development goals.

Heads of study cooperatives affirmed during the FGDs that the transformation to a new cooperative according to the Cooperative Law 2012 had caused particular difficulties, starting from the organizational structure that is complicated for an old agricultural form. The costs of operation, human resources, and the Annual General Meeting are high, resulting in reduced profits. Cooperative's officials have not yet fully grasped the contents of the new Cooperative Law, as well as the role of the new cooperative in organizing the production and consumption of agricultural products. They are often seen to be afraid of difficulties and hardship and work inefficiently. In addition, agricultural production, which is precariously affected by weather outbreaks and market price, still dominate the cooperative's activities. The salary is not attractive for encouraging members to join the cooperative's production teams. Most importantly, all cooperatives are relatively weak in linking with the markets and often affected by intense competition from many private businesses.

In relation to forestry, all three cooperatives are lacking knowledge, technology, and equipment necessary for SFM. Forest certification is found to be complicated for the cooperative's board to manage and maintain. However, all of them have a high expectation in forest certification that can provide more market opportunities, better

linkage with wood buyers, and other added value for forest-owned members and cooperatives themselves.

4.4 Validity and reliability

The concept of validity and reliability are defined differently across the scientific papers and fields of study. Still, they are commonly essential concepts used to evaluate the quality of research, indicating how well the chosen methodology and study results are performed. Angelsen et al. (2011) see these two concepts as the degree of the quality of a research proposal that is based on four generic indicators, including construct validity, internal validity, external validity and reliability. Construct validity refers to the degree of reflection between the operational measures and the theoretical framework. Internal validity is used to consider the accuracy of interfaces associated with instructive or causative relationships. External validity regards to the degree to which the conclusions can be generalised from the findings and applied to other subjects. Reliability is used to refer to the process of minimising errors in implementing the study to ensure consistency, dependability, and, repeatability (Angelsen et al. 2011, Zohrabi 2013). In the meantime, Zohrabi (2013) categorises the indicators of validity in a slightly different way by introducing the concept of utility criterion, which refers to the extent to which the research generates accurate and ample information for administrators, managers and other stakeholders. In short, reliability of the study aims to answer the question whether the result is replicable while validity examines the accuracy of the means of measurement and if they can measure what they are meant to measure (Golafshani 2013). However, Stenbacka (2001) requires a different definition for the reliability in qualitative research which '**to be solved in order to claim a study as part of proper research'.**

In general, the thesis is conducted from multiple sources of primary data that enable the validity and reliability. The data poll is considerably big compared to the typical scope of a master's thesis. There were 126 interviews made with different stakeholders to gain a comprehensive overview of the context. All interviews were conducted in Vietnamese, the author's mother tongue. It helps not only communicate with respondents easier but also capture their behavioural interaction during the interviews. The triangulation was

applied as an effective way to control bias and strengthen the validity of data and findings. Many of the transcripts and interpretations of interviews were handed over to the respondents for reviewing and confirming, ensuring of the plausibility and truthfulness of data. Besides, the author was fully aware of ethical issues associated with consent, confidentiality, consequences and integrity beforehand and addressed them adequately in the implementation of the research.

However, in practice, no research is resistant to errors, which differ in many forms (Norris 1997). The validity of this study is challenged by different issues, starting from the sensitivity of some interview questions. For example, the farmers often avoided inquiries related to income while further discussion about the drawbacks regarding abuse of power and insecure land tenure were commonly evaded. Secondly, the size of the data poll is still small compared to the size of the studied areas. Thirdly, some concepts used in the study are not fully inclusive. For instance, income from rubber trees is mainly from collecting latex, thus being excluded from income from forestry. Besides, the economic returns of group forest certification are much based on assumptions. The interview language is an advantage but also a barrier for ensuring the reliability of the study. Not all of transcripts and audio file were sent to the interviewees for their reviews before being used in the analytical process. The underlying reasons for that are either the respondents cannot understand English, or they are not familiar with Internet-based communications.

5 Main results

5.1 Challenges of PEFC group forest certification in Vietnam

Despite certain benefits of forest certification, there are still concerns among smallholders regarding the outcomes and the maintenance of group certification. **Figure 9** summarizes the main barriers restricting them from joining forest certification. On the contrary to the perspectives of government and international development agents, the cost of certification is not among the main concerns of small woodlot owners. This is due to the fact that the cost of certification is fully covered by international donors and private sectors. 13 out of 84 respondents do not see any challenges for the participation in certification schemes. At the same time, limited perception and unclear benefits are reported by 43 other

respondents. Many people hesitate to join group certification due to small landholdings, inadequate silvicultural techniques, and other reasons such as age or busy schedule. As the current forest certification scheme only applies to large timber for furniture production, the fear of typhoons and lack of capital to lengthen the rotation is found to be the major constraints encountered in the participation of group certification. More importantly, 17 respondents cannot join the group due to the missing land right certificate.

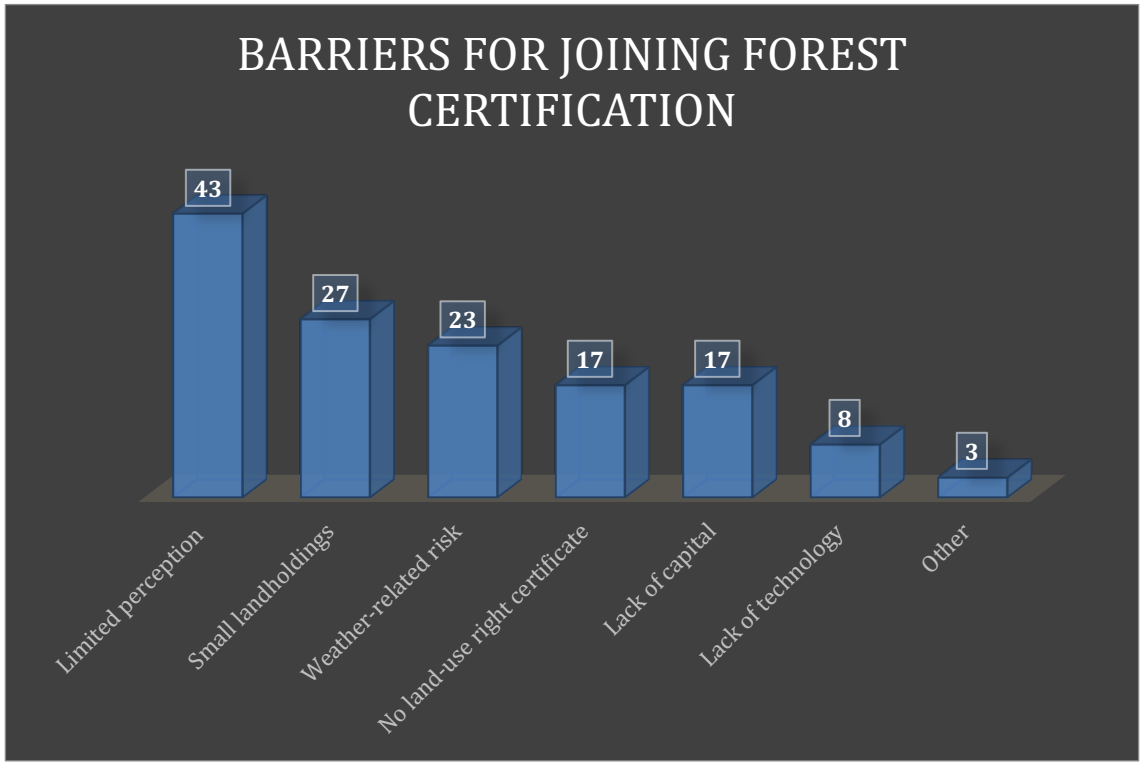

Figure 9. Barriers of smallholders farmers for joining forest certification

There are many similarities and differences in perceptions of challenges for group forest certification between farmers, scientists, government, and international development agents, starting from heavy reliance on external funding. This argument is supported by various previous studies (Auer 2012, Hoang et al. 2015 Flanagan et al. 2019a,b). In addition, group certification itself continues to face challenges in terms of self-sufficiency, unclear benefits for farmers, and exclusion of the poorest and smallest farmers, particularly those involved in the low-risk woodchip production. Besides, insufficient commitment from members can endanger the certificate of the whole group. Many

farmers withdraw from the group after 2 or 3 years because of their immediate need for cash. More importantly, smallholders in Vietnam are yet to get adequate policy support and incentives to participate and benefit from forest certification, while the land tenure is still fragile. (Hoang et al., 2015a,b, Midgley et al., 2017, Flanagan et al., 2019b).

As concluded from the interviews with forestry and forest certification experts, PEFC group certification also faces numerous hindrances starting from weak forest governance and land tenure, limited technical and financial capacity, and little understanding of SFM and forest certification. Besides, the expansion of PEFC certification has to confront other obstacles, such as the dominance of FSC certification and the questionable effectiveness of the group entity.

5.1.1 Forest governance and land tenure

Forest tenures refer to the entire bundle of forest ownership and the rights to access, use, and manage forest resources. Strong forest tenure policies and regulations are vital determinants to ensure benefits from forest and forestland. Even though the current national regulatory framework attempts to address the issues associated with land tenure and recognizes the rights of households and individuals to planted forests, major policy and capacity gaps still exist (Larson et al. 2013, To & Tran 2014). One interviewed expert stated that land tenure security was a somewhat sensitive topic, typically less discussed in many pieces of research. According to Vietnam's constitution, the State, presenting the whole citizen, acts as the absolute owner of the forest, and only granting the land use rights (To & Tran 2014). It means **'forest owners'** is just a formal concept without internal content, and securing the land title for establishing plantations appears a challenging task.

Despite strengthened policies in recent years, the issues related to forest tenure are not fully addressed, leaving numerous household with plantations having no land use certification. There is a lack of clear and accurate objectives for forest management and use when granting land-use rights certificates (To & Tran, 2014). Results from interviews and FGDs reveal that conflicts in land-uses and forest boundaries between local communities and forest management boards as well as state-owned forest companies still exist. Land encroachment by local farmers still happens and remain challenging to control.

An estimated 80% of law cases in the communes is related to land-use right disputes. One comment on tenure issue was recorded as:

- *'Although the Land Law has been revised seven times in the period 1987-2013, the land-use right has not yet met the standards. In practice, when tenure is unclear of not formalized, smallholders are often excluded from forest certification and other international schemes. Additionally, the small landholdings impede smallholders from harnessing the full economic benefits from forests'*

In addition to that, the national forest policies still lack equitability as they reserve priorities for state sectors and protect forest resources rather than secure property rights of the forest owners (Vu et al. 2016). Current forestry policies have created an unnecessary level of complexity for plantation growers, particularly the case for the small woodlot owners, where the degree of risk on an individual level is considered to be low (Laity et al. 2016). The roles and accountability of state and non-state actors are not well defined, followed by a lack of robust mechanisms to resolve tenure disputes. Three experts believe that the policies are also insufficient in creating the equitable sharing of benefits and ensuring gender and inclusiveness. Therefore, extensive effort must be placed on the tenure dispute resolution.

5.1.2 Insufficient guidelines for implementing SFM & FC

The efforts of the Vietnamese government in promoting SFM and forest certification are undeniable with many policy reforms. However, the implementation has been lacking in all but a few. For instance, even though the standards attached in the Circular 38 in force in 2016 draw on the principles and criteria of the FSC international FM standard, several measures are not included, on the basis that they do not apply to the Vietnam political, governance and forest management context. (Vu et al. 2016). Besides, the standards are more applicable for big companies rather than poorly educated smallholders, who do not have an understanding of complicated requirements for forest certification and are often afraid of all paperwork to maintain the certificate (Hoang et al. 2015b).

In addition to this, there is an inadequate number of effective policies in promoting forest certification, especially in supporting small forest owners to access loan package or insurance when they participate in forest certification scheme. Although a few policies

exist to incentivize the use of financial support from the government budget, detailed guidelines for accessing this support are not in place (Vu et al. 2016). As added by one interviewed specialists, the existing policies do not work well on the ground due to high interest, short timeframe for using loans, and involuntary commitment from banks that see forest grower as risky customers.

5.1.3 Limited technical capacity resulting in low forest quality

Limited technical capacity is among the three most reasons for the slow progress of SFM and forest certification in Vietnam, which are recognized by governmental institutions and NGOs. As reckoned by the interviewed silviculture experts, technical capacity limitations are often observed in measuring forest biodiversity, improving plantation productivity, assessing social-economic impacts of forestry, accessing forest database, etc.

Acacia plantations in Central Vietnam in general and in TTH province, in particular, are largely operated without guidance in best practice for optimal productivity and sustainable management. Structured observation and interviews with smallholders demonstrate that a majority of tree growers are not well trained in forest management and usually manage their trees with their own agendas that are based on experiences and rarely characterized by disciplined silviculture. Trees are commonly planted at high stocking, often between 2500-3500 trees ha^{-1} as opposed to the recommended density of 1100 – 1650 trees ha^{-1}. A high-density plantation is convinced to lower the risk of damage by typhoons and hurricanes, also help farmers to avoid the additional cost of refilling. During the plantation observation, the planting density can be up to 10,000 trees ha^{-1}, making trees at 2 – 3 years old look like dried firewood. The most popular land clearing technique is manual slashing, followed by the burning of residue. Although there is a warning of not burning slash and litter for site preparation, this practice still exists, being the critical cause of forest fires and catalyst for soil erosion. Trees are often harvested after 4-5 years for pulpwood, and the source of high-quality genetic seedlings are not yet accessible for many interviewed farmers.

5.1.4 Limited financial investment

Financial investment is vital to fully materialize the potential for the development of sustainable plantation forestry. In Vietnam, financial difficulty is among the primary causes of early harvesting, also being a significant deterrent of farmers to join certification programmes and even the withdrawal of their membership (Hoang et al. 2015b). According to Laity et al. (2016), in Quang Tri model, many farmers left the association after 4 – 5 years due to the complex and increased costs to meet and maintain certification standards, which worsen the inherently high transaction costs for plantation timber. Cost of certification is heavily dependent on external funding that is found difficult to certify a large enough area to supply wood volumes at a level that meets market demand (Hoang et al. 2015b). Foreign aids are gradually decreasing as Vietnam is becoming a middle-income country, while the current financial mechanism are not sufficient and appropriate. Even though the government policy has created preconditions for large-scale expansion of smallholder plantation, finance appears more accessible for the people that have accumulated land. Moreover, small landholdings further impede the collaboration with the private sector towards long-term investment. (Sikor & Baggio 2014, Vu et al. 2016, World Bank 2019).

5.1.5 Limited market for PEFC certified timber

As FSC has been in Vietnam for nearly 20 years, there will be inevitable successes. FSC, through its process, has been successful in raising awareness of forest certification, also building the capacity of smallholders in many aspects. The leading reasons for the popularity of FSC certification in Vietnam have been discussed in the previous chapters. First of all, the national forest certification was initially built in compliance with FSC standards, and this process has lasted for roughly 20 years. Secondly, the participation of the IKEA group and its linkage has imperceptibly resulted in the dominant perception of FSC certification. In practice, there is a narrow understanding of PEFC certification across the Acacia value chain; most of the respondents referred to FSC when being asked about how they perceived the forest certification. Only two out of 13 processing companies and 9 traders were aware of PEFC certification. Additionally, a limited market pull of PEFC

certified timber can be recognized from interviews with private sectors. An interesting question has arisen whether the popularity of FSC certification is a hurdle for PEFC certification in penetrating the market. When being asked about the PEFC certification, the presentative of one interviewed company expressed:

- *'Do you mean FSC certification? I have never heard about PEFC before. All of our customers are requiring FSC-certified timber'.*

5.1.6 Incomplete model

Incorporating forest certification to agricultural cooperatives appears to be a new approach for group certification in Vietnam. In essence, having cooperative alliance as the group entity presents many comparative advantages, starting from a wide network stretching from the national to commune level, followed by the ability to connect with other state management agencies and business. Cooperatives have a long tradition, being a common economic form. By the end of 2017, the Vietnam Cooperative Alliance has over 18,500 members, of which about 10,000 cooperatives are specialised in agriculture. They are among the leading organizations representing the collective voices of farmers and forest-dependent people, indigenous groups and rural communities. In the past few decades, cooperatives play an active role in the national agricultural restructuring, rural modernisation, and sustainable poverty reduction. (VCA 2017). Secondly, the operating budget of the cooperative alliance is allocated by the government, whilst members of the cooperative alliance are financially independent. The new Cooperative Law in force in 2012 that has evolved cooperatives into a new form, allowing them to operate as private enterprises, and enabling mutual support from their members in production, business and job creation. Interviewed forest certification specialists show a high expectation of this model to close the financial gap that is considered as a critical issue of existing models. (Vu et al. 2017). Commenting on the new form of cooperative, leaders of cooperatives and cooperative alliances said:

- *'The transformation has gained massive positive impacts, particularly in term of business planning and strengthened market linkage'.*

Interviewed forest certification specialists complemented other advantages of engaging cooperations and cooperative alliances in group forest certification, including dissemination of information resulting in better communication, enhanced management practices, and identification of local issues. Recognizing the comparative strengths of the cooperative model, leaders of FSC group certification in TTH province expressed that the group entity would be transformed into forestry cooperatives by 2018. This move is considered a wise step to advance their role in the value chain.

However, as stated by interviewed leaders of cooperative alliances, despite governmental supports, the contribution of cooperatives to the national economy is yet modest. Agricultural cooperatives are often viewed as a mean that helps the Vietnamese communist party to manifest its socialist ideology (Kerkvliet, 2005; Cox & Le, 2014). The country's socialist politics and centralized management is assumed to hamper enterprise culture and business of agricultural cooperatives (Cox & Le 2014). Indeed, forest certification specialists still showed concerns about the capacity of cooperatives presenting as the group entity of forest certification. 'Old wine in the new bottle' saying holds true for the transformation. Despite the new autonomy model, the perceptions of almost farmers are unconsciously dominated by negative traits such as economic ineffectiveness, lack of accountability, and weak governance. FGDs with three cooperatives uncovered heavy dependence on continuing community goodwill to operate effectively and sustainability in rural village communities. It means they can easily fail for reasons not related to the purpose for which they were formed.

There are several shortcomings of the cooperative alliance as the group entity, starting from a weak connection and expertise in forestry. Interviews with the heads of the cooperative alliances at national and provincial level reveal that forestry is not addressed separately and often combined with agriculture. There is almost no forestry officer, while agricultural extension workers are not familiar with SFM and forest certification. Rice cultivation and husbandry remains as the central focuses of agricultural cooperatives. The capacity of cooperatives in advancing forest producers' interest, particularly interest in forest certification, is still deficient. They are not self-sufficient to provide forestry services to its members, which is far below the needs of the national timber industry.

Financial condition and access to the market are found to be other major constraints. The degree to which cooperative's plantations are contributing to the annual income is relatively small. Cooperative's income is mainly from selling agricultural materials and services. Limited capital is among the main reason for cooperatives' plantation to be harvested after 4-5 years. The ability of cooperatives to react and connect their members with the changing markets unfortunately restricted.

In general, the potential of using agricultural cooperatives for group forest certification appears to be controversial and requires further discussion and research. In order to make it coherent approach, complexities associated with socialist ideology expectation, dependence on government, low capacity in human and financial resources, slow transformation process, weak enterprise cultures needs to be solved.

5.2 Acacia timber value chain

In this study, value chain approach, which revolves around analyzing the structure, actors and dynamics of the value chain, is used to grasp the value chain governance and find out who are the direct beneficiaries from PEFC group certification. Mitchell et al. (2009) believe that value chains are particularly well suited to understand how poor people can engage, or engage more beneficially, with domestic, regional or international trade. The diagram of the Acacia value chain is mapped in **Figure 10.**

The Acacia value chain usually consists of different types of actors, such as suppliers, producers, processors, importers, retailers, and end-users or customers. Smallholder farmers, as producers, often have a direct connection with input suppliers such as seedling and fertilizers, and intermediaries. In Vietnam in general and TTH province in particular, the interaction between tree growers and wood processors is relatively limited. Carpenters are a traditionally important actor; however, their presence in the value chain is trivial due to the scarcity of large Acacia timber for producing furniture for local use. In practice, the wood processing sector is divided into two main categories: woodchip and furniture production. Along with tree growers and wood processing enterprises, intermediaries play an important role in the value chain, who interact directly with downstream and upstream

actors. As clearly shown in **Figure 10**, a majority of Acacia timber is exported. Thus, the importer, retailer, and consumers are often located internationally.

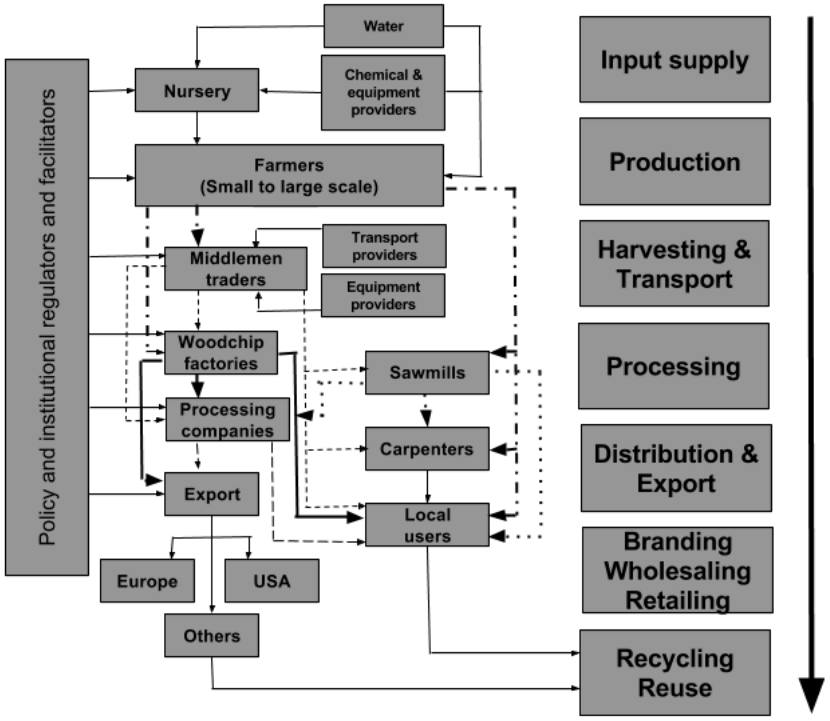

Figure 10. Acacia Value Chain (Adapted from Kaplinsky et al. 2003; Tran et al. 2013; FFD 2016)

With smallholder farmers as the primary research object, this study focus on clarifying their relationship with direct actors, including traders, wood chip factories, wooden product processors.

5.2.1 Middlemen

When trees reach a merchantable size, smallholders may approach or be approached by traders who often manage harvesting, aggregation, consolidation, and sorting of wood for sale to mills. Traders, or middlemen, are an intermediate actor in the value chain, who plays an essential role in the evolution of timber industry and trade (Midgley et al. 2017, Maraseni et al. 2017b). However, their contributions are often misunderstood. In practice, there is a strong reliance upon these middlemen to consolidate harvests from scattered small plantations into commercial consignments. Flanagan et al. (2020) see intermediaries as facilitators who effectively connect farmers with processors rather than solely timber

brokers. However, a majority of the interviewed farmers believe that they are far from getting fair pricing for their products from middlemen. They think that the real profits go to the middlemen who buy up the plantation at low prices and sell at outrageous prices to the processors. Many empirical pieces of literature surrounding the accuracy of this issue are of broad and current interest.

The increase in Acacia value has resulted in the rising number of middlemen in the recent years. The research finding reveals that being a trader is a particular job for the male, which might be attributed to the nature of the business. Every middleman has their own truck and harvesting team that commonly performs the most labour-intensive tasks such as felling, removing tree bark, bucking trees to logs of prescribed lengths, loading logs onto to trucks, and transporting them along busy highways. Sometimes, traders and their teams must carry out the opening and maintenance of forestry roads. These harvesting teams are formed by landless and poor farmers who cannot entirely rely on agriculture and forestry. These labourers have to work in a rather dangerous environment and usually are not provided with any personal protective equipment. They also do not have insurance and have to take all risks related to accidents and unemployment.

Tree growers have traditionally sold their timber to intermediaries while not knowing proper attributes for the price given and the fair prices on the market. Besides passively waiting for being contacted by smallholders, middlemen are also active in exploring the communes to locate the households with planted forest areas that are ready to be harvested. The majority of traders do not have their own warehouse. Harvested timber is usually transported directly to the processing plants after being converted into more marketable forms at the plantation. It usually takes several days up to two months to complete the trading, depending on the plantation size and the accessibility to the plantation.

In practice, it is very elusive to find and communicate with middlemen, as the nature of their business is relatively secretive and extremely competitive. As can be presumed from interviews that they usually work in isolation, and lack trust from one another. Each middleman has a good relationship with several processing plants and households. The most common similarity of this actor is their prosperity that is supposedly gained by

ripping off smallholders. However, this affluence is reasonable, as cash-rich middlemen assume almost all of the risk from the farm to the mill gate including administrative fees, price fluctuations, log quality, etc. Moreover, they possess solid knowledge of forestry that comes from practical experience rather than through learning, and better means than do both farmers and processors of harvesting and transporting. Finally, they are very active, acutely aware and up-to-date with all changes and requirements of the market.

Like other actors, middlemen face certain constraints and opportunities. First and foremost, smallholder plantations are limited in terms of both areas and yields coupled with the inadequate infrastructure that is closely related to the risk of deadly vehicular collisions. Scattered, small landholdings result in harvesting inefficiency and profit reduction. Since purchasing is done in the form of trees than logs, traders sometimes fail in estimating the timber volume and their profits, therefore, decline considerably. Secondly, traders are occasionally passive in price fluctuation and market demand. Additionally, the price of oil and gasoline used to operate trucks and chainsaws has increased rapidly in these recent years, even faster than the value of Acacia trees. Last but not least, traders are responsible for acquiring all the necessary permits and documents to harvest and transport timber legally. They also have to deal with frequent inspections from the authorities and pay all the tolls along the way to the processing plants. Two interviewed traders described their challenges as following:

- *'It is not an easy task as a common belief. There are more and more traders in recent years, and the competition among us is fierce. Meanwhiles, farmers nowadays are much worse off. They call many traders to ask prices and sell to the highest bidder. Sometimes they agree to sell it to me, but when the truck is about to arrive, they call to say it has already sold to someone else'.*

- *'Farmers think that the price is squeezed by us. It's not true. We have to pay for the costs of harvesting and transportation, and sometimes for the accidents occurring during the work. It's an amicable sale, but they keep blaming us. They just do not know that sometimes, we have to pay a 'black money' for the truck to reach the factory'.*

When it comes to the opportunities, it is evident that traders can benefit from rural development programmes, some of which are based on the expansion of Acacia plantation. Even though the interviewed traders rarely have capital-related difficulties, they can easily get favourable financial arrangements with low-interest loans from processors, which they can repay within several years. As almost processors prefer not to work directly with smallholders, intermediates with their ability to provide a large volume of timber are without a doubt critical, indispensable, but often-antagonistic counterpart in the value chain. Consequently, contrary to popular belief, middlemen add value by linking smallholders with the markets and providing greater accessibility.

5.2.2 Woodchip factories

As reckoned from the interviews with the Forest Protect Department of TTH province, the processing and export of woodchip have continuously expanded with a new woodchip factory established in the province. The province's timber and timber product industry is dominated by woodchip export for pulp and paper production with around ten medium-size factories. Interviews with woodchip factories point out China as the greatest importer, followed by Japan and Korea. There has been no clear evidence for the slowdown of the woodchip industry even though the GoV imposed the export tariff on this product from 0% to 2% at the beginning of 2016 as a consistent direction of limiting the expansion of this sector (To et al. 2019). It is noticeable from interviews that, chipmakers in study province prefer to purchase logs through intermediates because it is simpler and helps them to avoid complicated procedures of purchasing and transporting.

The country's woodchip industry has supplied 30% of the global demand. Theoretically, Vietnam holds power to shape the global market. However, in practice, the domestic woodchip sector has heavily relied on China, the world's largest consumer of woodchip. It also means the woodchip industry cannot increase the export price to compensate for the export tariff. This circumstance is attributed to low-quality of woodchip, weak linkage within the sector, unfair competition, and seasonal, small and fragmented characteristics of the industry. (To et al. 2019). Indeed, interviewed furniture processors often criticize woodchip as an unstainable sector which has negatively impacted the development of the

entire wood processing industry. The development of the sector has been threatened if not changed to a more sustainable way.

Even though TTH province has witnessed an expansion in woodchip production, interviews with experts and chipmakers show concern about the recent decrease in woodchip export price. Three reasons are detected, starting from the collusion of Chinese companies. Secondly, the quality of domestic woodchip is not strictly controlled. Many companies produce low-quality chips, giving opportunities for customers to reduce the price. Last but not least, weaker demand yet stronger supply on global markets, particularly the supply of high-quality chips in Australia, may result in the plunge in woodchip export. The drop in woodchip export will supposedly impact domestic chipmakers, thousands of forest planters, and other labourers in the sector.

In relation to SFM and forest certification, the perception of interviewed woodchip factories about these concepts is relatively low. Almost all respondents reckoned that price was not a hurdle preventing them from getting a certification, but market demand. Even though chipmakers often own FSC CoC certificate, only exporters to Japan market recognize the necessary and importance of this certificate. None of them neither is aware of PEFC certification nor has an intention to get the PEFC certificate unless being required by their customers. One interviewee expressed:

- *'We have a forest certificate for a few years, but it's just for show, never used. The certificate expires next year, but we probably won't renew it.'*

5.2.3 Wood product processors

To date, Vietnam has become the second-largest furniture exporter of Asia and the fifth-largest worldwide (World Bank 2019). As indicated by interviewed associations for timber and timber producers, Vietnamese timber processors have sought to strengthen their position on the global market by becoming strategic partners of foreign companies outsourcing their production. Besides a relatively low-cost labour force and favourable environment for foreign investment (World Bank 2019), he added flexibility as one of the

main competitive advantages of the Vietnamese industry. A well-known example is a partnership between 10 Vietnamese processors and IKEA Group, which is recognized as an important importer and retailer in the Acacia value chain (Nguyen et al. 2018).

It can be concluded from interviews with the leaders and managers of TTH province that the share of furniture processing sector to the provincial wood and timber products industry is smaller than woodchip production. Besides local carpenters and small handicraft companies, there is only one furniture company processing manufacturing orders for the IKEA's partner that is located in the south of Vietnam. In practice, big furniture companies are often situated in the Binh Duong province that is recognized as the country's furniture manufacturing cluster. It is also the place where almost all interviews with timber product processors were done.

All interviewed wooden furniture processing companies can be described as large, modern, and high technology. As obtained from interviews, even though the production of outdoor furniture used to heavily dominate the furniture processing sector, there has been a shift to indoor furniture products. However, the share of outdoor furniture has remained relatively high. This can be attributed to the flexible requirement of certified timber in manufacturing. Meanwhile, certified wood is mandatory for indoor furniture production.

Interviewed furniture companies differ in many aspects; however, they share few similarities, starting from a high dependence on imported raw materials, particularly certified sawlogs. They expressed that while woodchip factories were competing over sufficient raw materials for the production, they had to deal with the severe scarcity. Rubberwood is the most common domestic source of material, while pine and eucalyptus wood is the most common imported materials. In the study province, there is a fierce competition that forced wooden product producers to consolidate the purchasing process by mobilizing human resources to a small village to find raw materials, even from neighbouring plantations. Taking about this issue, an interviewee said:

- *'Domestic supply of sawlogs is not enough. We have to import 80% of raw materials from abroad. The reliance on imported timber not only reduces the*

profits but also sometimes affects production due to delay shipment. Indeed, the shortage of domestic certified timber results in a lost economic opportunity'.

The second similarity is the reliance on orders from foreign importers, which is understandable when Vietnam is among the greatest exporters of wooden products. However, the export value is not high as a majority of companies is only processing manufacturing orders. Interviews with wood processing enterprises and associations for timber and timber producers reveal a weak capacity in designing, branding, and distributing as the main reason. Although domestic companies have increasingly invested in the production line to expand the scale and enhance the competitive advantages, this is not enough to consolidate the position of Vietnam in the global market. An interview, when asked about the main difficulties of the company, said:

- *'There are many difficulties, of which scarcity of raw materials is the most important. The production line and design capability are other weaknesses of the domestic wood processors'*

In relation with other challenges hindering the development of domestic furniture companies, one interviewee added:

- *'Many of our foreign customers concern about the timber traceability, sustainability, and issues associated with intellectual property. Indeed, timber traceability and social responsibility are causing a lot of difficulties for domestic enterprises. In my opinion, the process of verifying the origin and legality of timber is exceedingly complicated, particularly for smallholders'*

The importance of certification for maintaining market share and selling products can be confirmed from the interviews. One company blamed the requirement for certified timber as one of the main reasons restricting them from increasing production scale. In practice, all interviewed companies both have FSC CoC certification and import FSC FM certified timber. However, only one company was aware of PEFC certification. When asked about the PEFC certification, a typical response was received as:

- *'How do these two schemes differ from each other? Is PEFC globally popular and accepted? I do not know about it. For now, all of our partners only request FSC certification'.*

The same reaction was recorded for the question about the perception of a national forest certification system that is endorsed by PEFC certification:

- *'It's great if Vietnam has its own forest certification scheme. However, are you sure if it is accepted in the market? I have to remind you that our customers only demand FSC certification.'*

5.3 Forest smallholder farmers: Baseline condition

Smallholder tree growers make a substantial contribution to the supply of commercial timber and the national development policies in Vietnam (Midgley et al. 2017, Flanagan et al. 2020), also being a critical component of livelihood generation, food security, and climate change mitigation (Nambiar 2015, Nambiar 2019). Forest smallholders in TTH province share a range of similar traits of Vietnamese timber producers, but also have their own characteristics, which differentiate themselves from those who manage natural forests, large, commercial and state plantations.

5.3.1 Human assets

The average age of smallholder farmers participating is 55, of which nearly a half belongs to a group from 50 to 60 years old (**Figure 11**). Every four out of five respondents are male. All the respondents belong to the predominant ethnic, the Kinh, which accounts for 87% of the population in Vietnam ethnic group.

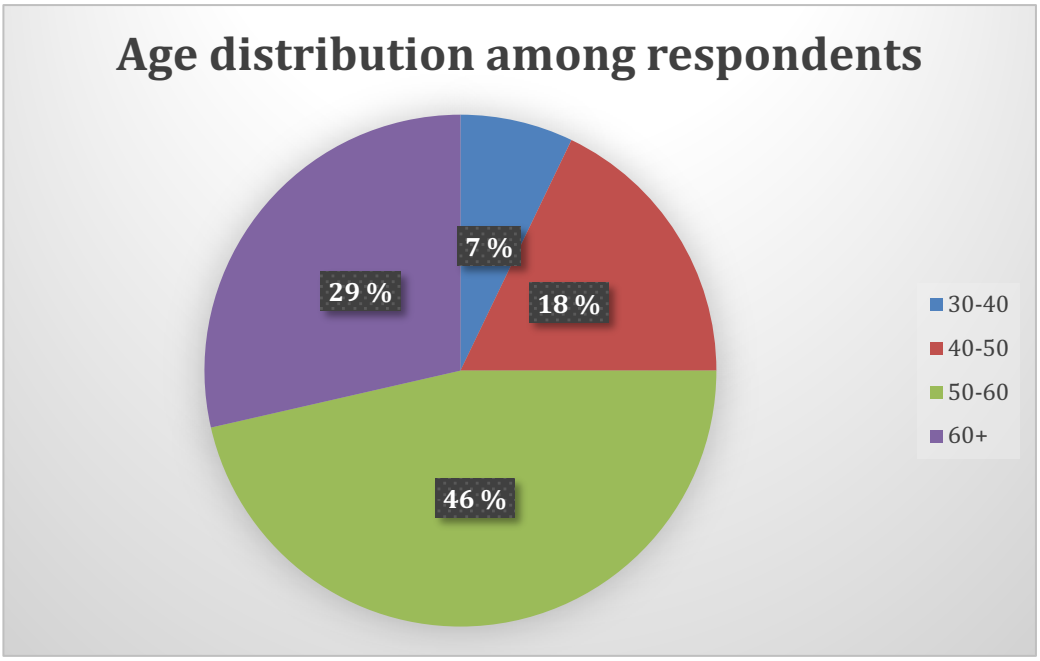

Figure 11. Age distribution among respondents

The majority of respondents are poorly educated with secondary school as the most common level of education. The illiteracy rate among the respondents is 0%, but, only 3 out of 83 surveyed farmers holds university certificate. The percentage of respondents having high school education is 23% **(Figure 12).** Only 21% of interviewees are employed with a regular salary, many of those are working either in cooperatives or cooperative's nursery. Hence, the complex compliance systems like forest certification are in some way inappropriate and incompatible with a majority of smallholder farmers. Poor education makes smallholder farmers poorly connected and unfamiliar with commercial and legal demands of wood products value chains. Hence, they are often viewed as the most vulnerable, disadvantaged in transactions by traders, and exploited link in supply chains, with high levels of poverty and low levels of productivity (Flanagan 2019a).

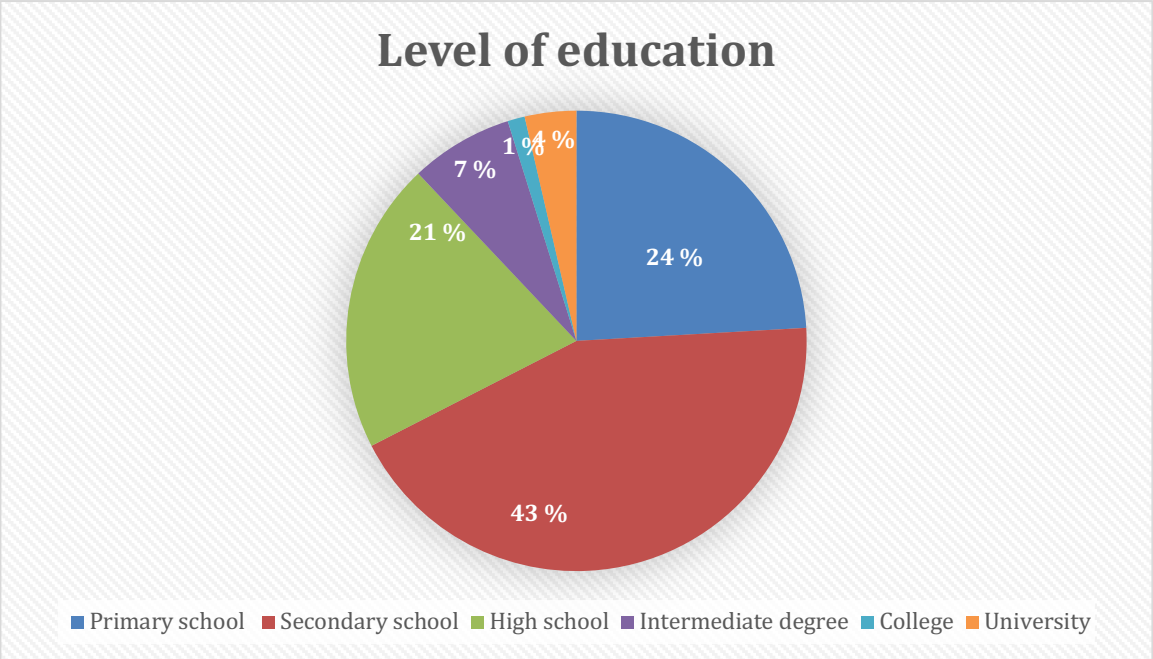

Figure 12. Level of education of interviewed farmers

5.3.2 Social assets

The level and access to social assets vary among smallholder farmers and cooperatives. In general, a high level of trust in cooperatives is agreed by 91.67% of respondents. All of the interviewed farmers actively participate in training and workshops and follow instructions given by the cooperatives, which are recognized with a strong institutional link and labour provision. Many of them often use services from cooperatives, which are open to everyone. In addition, smallholders have a high level of autonomy in making a decision. The members of cooperatives can freely choose between small local service providers or cooperatives; however, they are not obligated to sell their products to the cooperatives in return. Besides being a member of the cooperative, a majority of respondents are also a member of other association such as farmers' union, women's union, youth's union, veterans' union. Some of them are a member of the forest owner association, which is the group entity for FSC certification.

On the contrary, the cooperation between farmers is reported relatively low. They often help each other in exchange during the planting time as a way to avoid paying money. However, there is no collaboration and sharing of experiences among farmers to advance

the production and harvesting process. Indeed, almost all respondents refused to cooperate with their neighbours in harvesting and transporting process. Selling standing trees to the traders is much preferable. Smallholders usually produce separately following their own methods. This can be partly attributed to the different level of wealth, and small landholdings that they are not willing to invest more.

There are different sources of incomes, including farming, husbandry, forestry, rubber, and services. Of which, growing rice and crops are mainly for their own consumption; only a small part is sold. Quantifying exact net income is not simple. For example, labour costs are usually excluded from the total cost. Also, a majority of people who have aged 60 and over, have received financial support from their children, who are living and working in big cities. An estimate for the average net annual income of interviewed households is €5,665. The yearly income varies from €1,488 to €17,116, depending on the number of working-age members in the household, landholdings or diversified sources of incomes. For example, owning a small transportation business can generate a stable amount of nearly €9,000 per year. A household with four out of five members at working age, owning only 1ha planted forest can make a total annual income of €7,554. People with a stable office job often have a higher household income and consider forestry only as a part-time job. Limited access to capital and knowledge is proven to hinder the possibility of farmers to benefit from non-timber products such as beekeeping, planting herbs, etc.

Plantation and labour remuneration from planting trees are two main sources of income generated by forestry. However, in this study, the contribution of Acacia plantation is presumed only from selling trees. With an average of 21.74%, interviews with 84 households show a relatively small share of Acacia plantation to the annual net income. Even though there is an exceptional case where Acacia plantation accounts for 81.47% of the yearly income, there is also a case where the number is only 1.52%. This can be attributed partly to the significant difference in landholdings. The first interviewee owns 43ha while the second one has only 0.8ha. **Figure 13** illustrates the contribution of Acacia plantation to the net annual income of 82 interviewees. Two other interviews have just planted the first rotation and yet harvest.

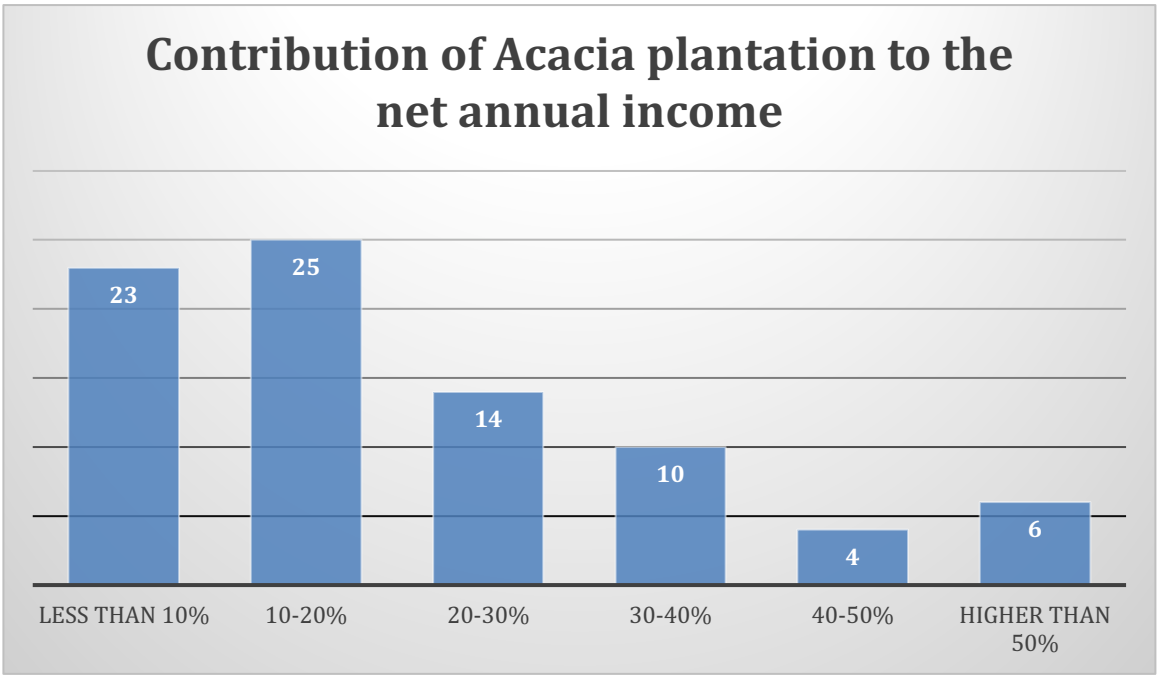

Figure 13. Contribution of Acacia plantation to the net annual income

As can be seen in **Figure 13**, Acacia plantation contributes less than 10% to the annual income of 23 interviewed farmers. The numbers of people who have a share from planted forests of 10-20% and 20-40% are relatively the same, accounting for 30% of the total respondents, respectively. Only 6 interviewees have higher than 50% of the contribution from Acacia forest. Plantations are commonly considered as 'living bank accounts' from where farmers can quickly and easily derive money for immediate needs such as new or renovated houses or payment for children's education by selling their timber.

In practice, the profit per ha of Acacia plantation highly depends on the production costs, which differs across the respondents and is often much lower compared to the standard. This is attributable to the allocation of labour and intensity of silvicultural practices. The total cost is usually less in households, which either carry almost all activities by themselves or do not use fertilizer and leave the trees without maintaining activities after planting. On the contrary, some households which are with a better financial condition, own large forest areas or do not have enough labourers, usually pay the full cost. Taking about this issue, an interviewee said:

- *'The cost is not that much, just for seedlings and fertilizers. My boys and I did it all by ourselves. We don't hire a planting machine because it's too expensive for us. For 4-5 years, we spent around €400'*

Forestry is perceived as hard work during planting and harvesting, and the economic benefits from Acacia plantation depend on the level of cultivation. Men are more often involved in forest practices than women. However, FGDs with study cooperatives show increasing participation of women in forestry in these recent years. More than half of male respondents reported that their wives were also involved in the forest practices. However, women's rights over forest land remain less than men's. Men are often named as the head of the household in the national registration system. Even though the Land Use Right Certificates require the names of both husband and wife, the land-use decision is often made by men. Despite an increasing contribution to the sector, the role of women in the forest product value chains is poorly supported, and gender equality has not yet been mainstreamed (World Bank 2019). In addition to this, interviews uncover a reality that the young seem not to be interested in forestry as most of them leave the villages for higher education or jobs with better reward. The number interviewees aged between 30 and 40 is only 7%.

5.3.3 Physical assets

To and Tran (2014) argue that smallholder plantations in Vietnam are essentially successful. However, farmers often lack the appropriate technical knowledge and fair access to both inputs and outputs for sustainable production and management. Silvicultural practices are still mainly based on experience that is inherited from previous generations than through education. Around 37% of respondents afford computers and access to the Internet; however, it is not used effectively as a source of information for silvicultural practices. Farmers seldom learn new techniques from newspapers and articles. The most common sources are from the agricultural programs in television and through training courses provided by cooperative, farmer's union, and other related associations.

Nearly 30% of respondents have difficulty accessing high-quality genetic seedlings. Smallholders can purchase seedlings from multiple sources, including small local

nurseries, barracks of the military, state forestry company, and cooperatives' nurseries. Interviews indicate a high dependence on small local nurseries, which provide cheap seedlings for EUR0.02-0.03 seedling^{-1}. Without a certificate of origin, this genetic quality of these seedlings is often questioned. In practice, seedlings are transported to the plantations by motorcycle, which is believed to cause the death of young seedlings in the first year. Closed plastic bags are often used, restricting root development. The quality of seedling provided by the state-owned forest company is much stable and with a higher survival rate that is resulting in a higher price. In Hoa My, many farmers are now able to access to material sources instead of picking small seedlings as products of natural regeneration.

Almost all silvicultural practices are done manually with simple tools in the first two years; and farmers do commonly not seek professional extension services. Only a small number of them can afford to hire a planting machine. The judicious use of fertilizer is, without a doubt, an important determinant for a productive plantation. The guidelines for using fertilizer are apparent; however, the amount used in practice often less and differs across the cooperatives. Instead of using 300 grams in the first year and 200 grams in the second year, fertilizer is only used in the first year. This can be attributed to limited finances and inadequate focus on forestry as the main livelihood. Notably, in Hoa My cooperative, where a greater part of plantations is located in sloping hillsides, fertilizers are seldomly used. The farmers believe that the faster and stronger the trees grow, the easier they fall down.

Good access to the plantation is required not just for extracting logs at the time of harvest but also to fight forest fires and inspect plantations regularly. However, the general infrastructure in plantation forest areas is inferior, with inadequate investment in roads and bridges. In practice, forestry road is ranked as the third greatest challenges for smallholder forestry, even higher than access to the good seedlings with 24 mentions. Explaining forestry road as the main reason restricting farmers from accessing good quality seedlings, one farmer said:

- *'I am fully aware of better quality seedlings from cooperative's nursery. However, the road is so bad that they cannot deliver it to the plantation. But the private*

stores are willing to do that, even though many seedlings die before reaching the destination because of the heat and also the primitive method of transportation.'

Costs of opening and maintaining forestry roads are often subtracted from the timber prices, making these costs borne by small woodlot owners. Sometimes, poor forestry roads put pressure on the farmers, forcing them to harvest simultaneously with their neighbours, even though their plantation does not reach planned ages or optimal prices. Inadequate physical assets affect the way that farmers sell their timber. Harvest is often sold to the middleman at the stumpage price. Only a small number of smallholders can organize their harvest and haulage and deliver timer to the mill gate. In relation to the forestry road, one farmer complained:

- *'The selling price here is often a half or one third less than other places because the traders have to make a forestry road. We can also do that, but it even costs more than just letting them do. Without maintaining, the road is getting worse after harvesting, and we have to pay the next time again'.*

5.3.4 Natural assets

Plantation forestry as a livelihood is strongly dependent on the access to natural assets, of which land is the most critical. It is considered as the most influential determinant of how households interact with natural resources, creating both opportunities and constraints for smallholder forestry. However, land tenure is a major concern of many interviewees. Many of the interviewed households were allocated the plots used for planting trees in the early 1990s, under the project **'Greening the Barren Hills Program'**. Implemented in 1993 nationwide, the programme has been recognized as a great effort to utilize barren land and hills, alluvial coastal areas and water surface areas (GoV 1992). Besides, some other respondents were the beneficiaries of the **'Five Million Hectares Reforestation Programme'** that run from 1998 – 2000, aiming at increasing the national forest cover to 43%. In this programme, the government provided seedlings, pesticides, and forest extension activities for households to plant trees for raw materials. In addition, with each ha, farmers were supported €56 – €186, depending on the region. (GoV 1998). In the study

area, Acacia hybrid has been grown since 2010; many of the plantations are therefore in its second rotation.

The current regulatory framework recognizes the tenure rights of individual households over forests and forestland for at least 50 years with the possibility of renewing for another 50 years. It allows individual households to benefit from the sale of timber and non-timber forest products that directly contributes to improving livelihoods. However, landholdings are generally small and scattered, often less than three ha, preventing farmers from optimizing benefits of planting trees. It can be seen from **Figure 14**, ownership of less than 3 ha is the most common, of which 12% of the respondents have less than one ha. The percentage of farmers, who have more than 1 ha but less than 3 ha, is 52%. Only 14 out of 84 respondents are owning and managing more than 5ha, two of which have more than 30ha. A majority of the household owns from one to five plots. Almost 47% of the households manage only one plot while only 9% of them own more than three plots. In many households, Acacia trees are also planted on agricultural and other non-forest lands, around houses and along roads. The situation is further exacerbated by the remote locations between the plantations that are under the same ownership. It is one of the root causes restricting the participation of smallholders in forest certification schemes. One individual stated that:

- *'For me, forestry is not hard work, often busy in the first year and sometimes in the second year. Actually, I do not have any difficulty. I only wish to have more forest. If I own 5-10 ha, I can live well with forestry, even be rich'*

And another commented:

- *'Households who have small and scattered areas of forest would be very difficult to manage their forest area, which follows the forest certification standard. It is also hard for them to look for the markets if they do not have a good connection with wood product companies or sign contracts with them to sell their product'*

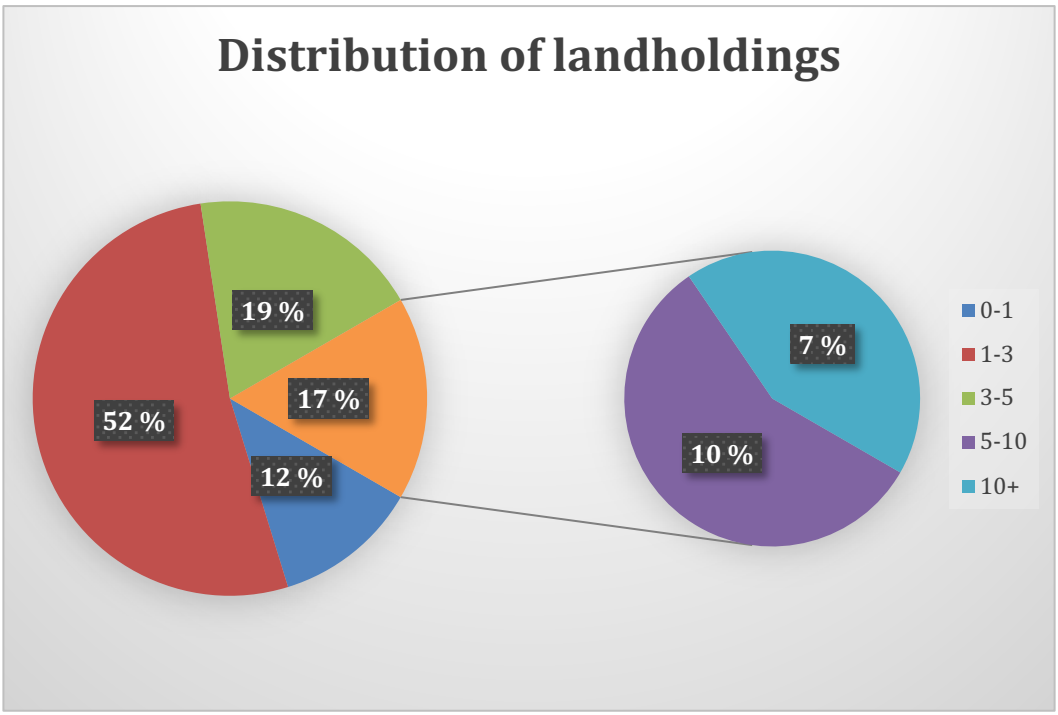

Figure 14. Distribution of landholdings

The prosperity of the farmers is highly dependent on how many hectares of forested land they own. **Table 8** and **9** can give a clear overview of the relationship among the landholdings and the contribution of Acacia plantation as a means of livelihood. Commonly, income from planting rubber can also be counted as income from forestry. However, in this case, the only contribution from Acacia plantation is counted.

Table 8. Contribution of less than 1 ha Acacia plantation to the net total income

Plantation areas (ha)	Net income from Acacia plantation (€)	Net total income(€)	Contribution of Acacia plantation to net total income (%)
0,8	85.21	5506.98	1.55
0,9	167.44	1860.47	9.00
1	297.67	3162.79	9.41
1	418.60	5953.49	7.03
1	520.93	7553.49	6.90
1	409.30	5953.49	6.88
1	232.56	3013.95	7.72
1	223.26	1748.84	12.77
1	186.05	2306.98	8.06
1	155.16	2418.60	6.42

It is clear that the income increases in households being allocated more land for planting trees. While ownership of less than 1 ha contributes less than 10% of the net total annual earnings, more than 10ha of Acacia plantation can generate from about 30% to 80% of the total income per annum.

Table 9. Contribution of 10+ ha-Acacia plantation to the net total income

Plantation areas (ha)	Net income from Acacia plantation (€)	Net total income(€)	Contribution of Acacia plantation to net total income (%)
10	3348.84	7144.19	46.88
10	2325.58	7441.86	31.25
11,9	4126.51	7627.91	54.10
14	5730.23	14139.53	40.53
14	2976.74	5581.40	53.33
15	4241.86	8930.23	47.50
30	11162.79	15181.40	73.53
43	11423.26	14027.91	81.43

Planted forests in study areas are also characterized by poor quality soil and landscape, which was partly ravaged by the war. Soil erosion is a common problem owing to the combination of heavy rainfall, high density, steep slopes, intensive clearing of the understory and frequent slash burning. A majority of plantations in Hoa My cooperative is located in steep terrain with poorly erodible soils, and very vulnerable to climate change, leading to many difficulties in transporting seedlings and fertilizers to the forest. Water, which is essential for planting trees, is also a problem. Plantations are commonly located far from the water resources, bearing a high risk during the occurrences of forest fires. Referring to the challenges associated with the forested land, a farmer said:

- *'I have never used planting machine because it's too difficult to transport it to the plantations. Transporting seedings and fertilizer are already causing a lot of troubles. I do not often visit my plantation because it's far from my house, maybe once a year. The price of timber is rather low compared to other districts because of the forestry road. I have asked several traders, and they said the same'.*

5.3.5 Financial assets

Access to external finance, without doubt, is a critical determinant of how smallholder farmers establish and manage their plantations. In all the study areas, monetary benefits emerge as the primary objective of smallholders venturing into tree planting. However, a majority of interviewed tree growers are financially fragile, which is the unrivalled reason for the risk aversion of smallholders, being the cause for the prevalence of unsustainable management practices and short plantation rotations (Sikor 2011). Common sources of income include crops, husbandry, and growing trees. In Hoa My cooperatives, most of the respondents have extra earnings from either owning or working in the rubber plantation. On average, planting Acacia trees accounts for around 21% of a household's total annual income. The plantation is often viewed as a 'green bank' for special occasions.

In the study area, small tree-growers can access numerous financial resources (Sikor & Baggio 2014, World Bank 2019), of which commercial banks are the easiest way to get a loan with collateral. As stated by interviewed farmers, plantation and house can be treated as collateral; however, they are rarely well valued and always require Land-Use Right Certificate. However, only a small number of respondents is willing to get loans from commercial banks due to a relatively high-interest rate compared to the financial incentives from projects. The State also has support packages, of which money is allocated through projects, local authority, and social organizations such as the Women's Union, Farmers' Association, Veterans' Association, and Youth Union. For instance, a poor household in compliance with the national standards could borrow a maximum of roughly €1,875 in 5 years, with a monthly interest rate of 6.6%. Since March 2019, the maximum loan has been raised to €3,750 that can be paid in 10 years (VBSP 2019). Orphans and students from poor households can access loans for disadvantaged students. Besides, financial incentives can also come from internationally funded projects. More than half of the respondents borrowed money from the Forest Sector Development Project (WB3), which was funded by the World Bank in the period 2004-2015. However, 54% of interviewees have limited awareness of where they can access the loan.

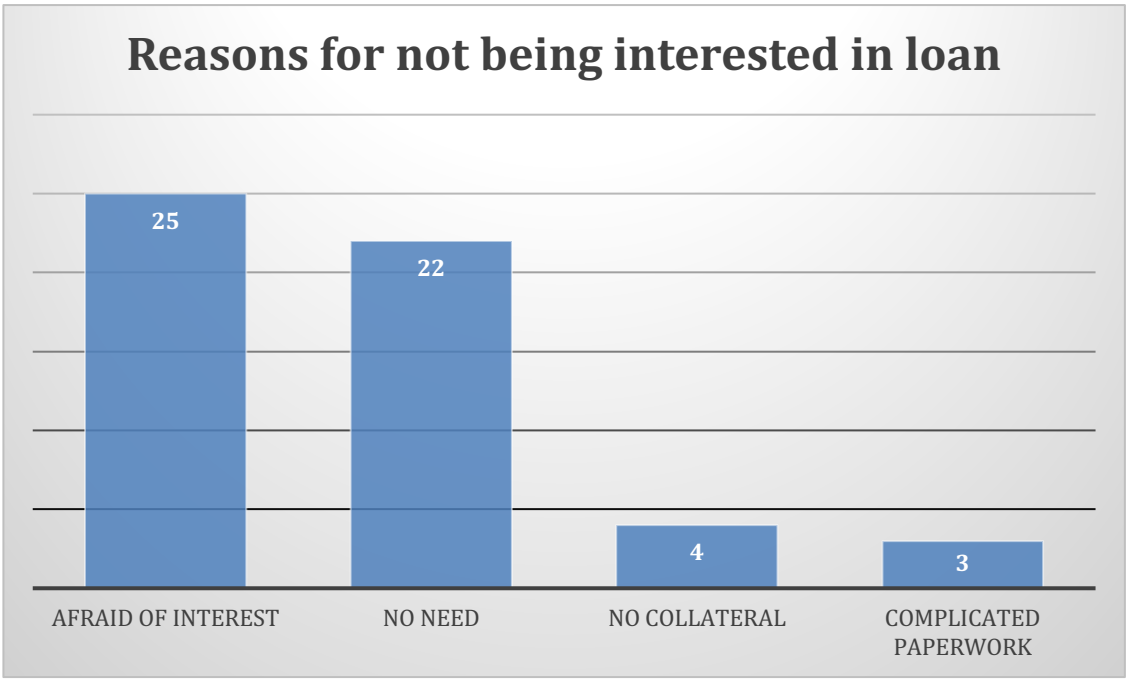

Figure 15. Reasons for not taking on loan

Lack of capital is reported as the highest risk of smallholders. Nearly 60% of respondents borrowed money for planting trees in the past. However, only 30 out of 84 interviewees are keen on borrowing money. The fear of not being able to pay back is the main reason hindering farmers from obtaining a loan. Besides, many people do not need to take on loan because either their plantation is too small or they have a good financial condition. No collateral and complicated paperwork are further reasons. An answer was recorded from one interview that:

- *'Getting a loan is not difficult, but I do not want to get it because I am afraid of not being able to pay back'.*

5.3.6 Vulnerability context

The potential contribution of smallholder farmers to the sustainable supply of industrial wood is pivotal. However, their role in the value chain is not well defined. Smallholder farmers are often viewed as particularly vulnerable, confronting a disproportionately high share of risks associated with plantation at all scales (Laity et al. 2016, Midgley et al.

2017, Flanagan et al. 2019b). The analysis of vulnerability shaping the asset core is based on the lessons learned from the existing FSC group certification models, coupled with observations and results from interviews.

Flanagan et al. (2019b) define risk as a probability of certain events that may occur, and the severity of impacts resulting from such occurrences. Risks associated with plantation forestry and forest certification can be classified as internal and external. Internal threats are related to structural inefficiencies, inappropriate silvicultural practices, lack of labour safety protection, inefficient use of resources, or inadequacy of capital. Meanwhile, the categories of external risks start with environmental risks such as natural disasters and diseases or pests. Market risks, as critical external risks, are often associated with stakeholder expectations, fluctuations in price, market competition or regulatory obligations. **Figure 16** shows the most critical risks hindering small woodlot owners from benefiting from their planted forests according to the interviews.

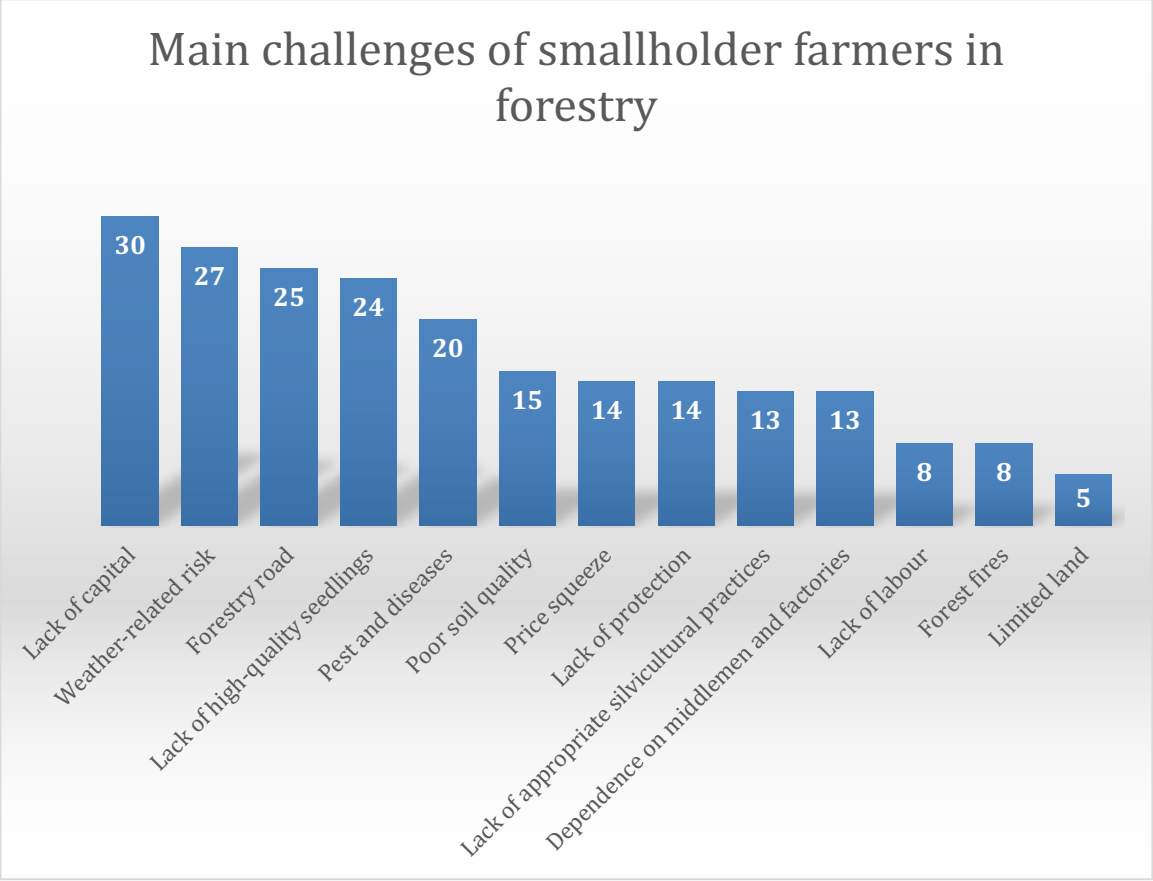

Figure 16. Main challenges of smallholder farmers in forestry

Despite the initial success of FSC group certification, a considerable number of farmers withdrew from this scheme (Laity et al. 2016; Hoang et al. 2019). Several factors can be attributed to this circumstance, including unclear benefits of forest certification, daunting paperwork, and binding conditions. For instance, to participate in the group certification, farmers must purchase seedlings from certified nurseries and keep the receipt for the record. However, there are only 7 certified nurseries across the study province, and bookkeeping is not a common practice for almost all farmers. Many of them often purchase seedling and fertilizers from local stores without a certificate of origin. Most importantly, smallholder farmers often lack the capital to lengthen their plantation over 7-8 years to produce sawlogs while fear of disasters such as typhoons always exists. Discussing this issue, one interview said:

- *'I want to keep the trees for 8-10 years for better profit. However, incentives programmes only lend a maximum of 5 years. I have to sell my plantation to pay the debt.'*

Currently, 25 out of 84 interviewees has already been a member of FSC certification. 67 out of 84 respondents are registering for the piloted PEFC certification. However, only a few of them have a comprehensive overview of forest certification. A majority of interviewed farmers understand the concept of SFM in improper ways, and some of them see forest certification as a constraint without clear benefits. There are different reasons for taking part in the forest certification, of which 'because being invited by the cooperative' is surprisingly common. It shows the efforts of the group entity in raising awareness for the members are not enough. Besides the trust of members on the organization, the decision to participate in forest certification should be based on transparency and voluntariness. Limited perception and lack of commitment present certain risks for the failure of the group certification.

In the study area, small-scale plantation growers are proven to be very sensitive to environmental, climate, and weather-related stress. Human-induced climate changes continue to progress, resulting in more frequent natural disasters such as floods and typhoons, which possibly lead to extensive losses and eventually unpredictable

fluctuations within the wood processing industry. They are ranked as the second high threat by nearly 32% of the farmer informant group. As agreed by interviewed experts and farmers, Acacia plantation in Central Vietnam periodically suffers from wind damage attributed to the intense tropical cyclones making landfall in the country, especially devasting typhoon every five years. When these events happen, farmers have to face dead loss without any insurance. It is the reason for the commonality of the short-rotation cycle in the region.

Pests and disease are found only in Phu Bai village. Damage does not result in death, only deforming or suppressing tree growth. However, it does not mean this type of risk is less worried as it was recognized as a severe threat in Indonesia and Sabah, Malaysia (Harwood & Nambiar 2014). In practice, there is no action plan to control pests and disease; diseased trees are left to die without any regime, and usually used as fuelwood. Proactive measures to deal with the threat of disease are, therefore of high importance. Additionally, risks of theft and damages caused by grazing livestock are identified as a result of insufficient protection mechanism. In Hoa My cooperative, soils and sand from forested land are even exploited and sold to the construction industry. When asked about the associated risks, one individual stated:

- *'We have to face a risk of theft when planting trees for sawlogs. Trees can be stolen for buying alcohol or paying for personal necessities. The plantation is far from the house while the cooperative's protection team is relatively small. We have to bear the loss without any compensation. '*

Many of interviewed farmers are not aware of the exact value of their plantation at the mill gate. They are unable to conduct plantation inventory and do not know the timber volume in negotiations. Additionally, the lack of means of harvesting and transportation make farmers highly depend on traders. The price is often set by the middlemen through a verbal agreement, and negotiation is refused in case of poor road condition or higher supply. Even though most of the trades are made on amicable sale basis, some interviewees still feel a lack of power in the price negotiation and are often treated as the price taker. Meanwhile, the GoV is still lack of a price control mechanism to protect this vulnerable group. This view was echoed by on many interviewees and further explained by one:

- *'Price squeeze indeed exists. Some traders cooperate in setting the price and dividing operating areas. Even though I called to different traders, the price is no difference.'*

Recent research and interviews with experts in forestry industry show that growing trees for woodchip would remain as a trend for the next few years owing to the simple operating requirements coupled with still high demand from pulp and paper industry. However, the recent falling price has signalled possible market volatilities, which will directly impact smallholders. The changes may stem from new modifications in wood quality, specification, standard, and consumer demands. In addition, engaging small plantation growers in a competitive international market demands more complicated legality requirements such as the EU-FLEGT, and forest certification. (To et al. 2019). Besides, there is a small number of respondents raising their concerns about policy and regulatory risks, particularly with respect to land allocation. One expert argued that incomplete policy framework coupled with poor education could result in a situation, where farmers can lose their land-use rights to the person of means. Unfortunately, it happened in reality. An interviewed farmer was forcibly taken back a land, which was allocated for him several years before, for a farm construction project. However, after more than a year, the land was still abandoned while the farmer wanted to get it back to plant trees.

5.3.7 Institutional and policy context

There are many actors working together towards the inclusiveness and enhancement of plantation forestry, and development of forest certification in Vietnam. The crucial role of the international development agents such as WB, FAO, UN-REDD, AgriCord, FFD, and private sectors has been proven in the previous chapters. However, the responsibility of the state organizations has not yet clearly stated. This section will thus focus on the key leading government actors that work ambitiously towards profitable, inclusive and sustainable management of forest and forest certification. Of various organizations, the Ministry of Agriculture and Rural Development (MARD), the Vietnam Administration of Forestry (VNFOREST), and the Vietnamese Academy of Forest Sciences (VAFS) are the most important.

MARD leads the management function and cover a wide range of industries, including agriculture, forestry, fisheries, irrigation, water services, and rural development. In relation with forestry, MARD is responsible for directing, guiding and inspecting the implementation of the government regulations on forestry development mechanisms and policies, forest management, protection of endangered, rare and previous forest plants and animals. Additionally, MARD assumes all the prime responsibility and coordination with related ministries, branches, and People's Committees at the local level in managing the special-use forests and protecting forest ecosystems. The policies and programmes enacted by MARD are implemented through the Department of Agriculture and Rural Development (DARD) at the provincial, district, and commune level.

Established in 2010, the Vietnam Administration of Forestry (VNFOREST) is an agency under MARD, taking overall responsibility for the management and development of the forestry sector in Vietnam. VNFOREST is formed by four key departments whose names represent their functions: Forest Protection, Forest Utilization, Forest Development, and Nature Conservation. This agency is also accountable for the country's SFM and forest certification.

The Vietnamese Academy of Forest Sciences (VAFS) is a scientific institution under MARD. Its functions are to carry out scientific research, technology transfer, post-graduate training, international cooperation, advisory services, and business regarding forest research, development and extension in Vietnam. With its well-organized affiliated regional institutes and field stations, VAFS is the leading organization in the research capacity for plantation management and sustainable forest management. On March 2015, VAFS was nominated by MARD to establish a national FM certification system that will be endorsed by PEFC certification. With VNFOREST, VAFS holds the leading role in establishing the national forest certification system in Vietnam. Vietnam has become a member of PEFC International since June 2019.

In relation to the development of forest certification, many decisions and circulars have been promulgated since 2015 **(Table 10)**. These documents aim to raise awareness and capacity on SFM and forest certification, develop and promote SFM and forest

certification, enhance state management on SFM and forest certification, and establish standards as well organizational structure for the national forest certification scheme.

Table 10. Important legal documents for the development of SFM and forest certification in Vietnam

- Decision 2180 dated 16/07/2015 by MARD on Approving the action plan of sustainable forest management and forest certification period 2015-2020.
- Decision 83 dated 12/01/2016 by MARD on Approving the Scheme of implementation of sustainable forest management and forest certification period 2016-2020
- Decision 4061 dated 05/10/2016 on Establish a steering committee for sustainable forest management and forest certification for the period 2016-2020
- Decision 886 dated 16/6/2017 by Prime Minister on Approval for Sustainable forestry development program period 2016 – 2020
- Decision 3454 dated 22/8/2017 by MARD on Established the Standard Development Committee members of Sustainable forest management and Chain of Custody
- Decision 1288 dated 01/10/2018 by Prime Minister on Approval for sustainable forest management and forest certification.
- Circular 27 and 28 dated 16/11/2018 by MARD on Regulations on management and traceability of forest products
- Circular 28 dated 16/11/2018 MARD on Sustainable Forest management regulation
- Decision 190 dated 11/1/2019 MARD on Assigning the tasks of sustainable forest management and forest certification allocated to the MARD as regulated by the decision No.1288 of the Prime Minister
- Decision 191 dated 11/1/2019 by MARD on Establishment of the Vietnam Forest Certification Office (VFCO)
- Decision 49 dated 25/2/2019 by MARD on Functions, duties, rights, and organizational structure of the office of forest sustainable management certification
- Decision 50 dated 25/2/2019 by MARD on assigning concurrent personnel resource (staff) for functioning of Vietnam Forest Certification Office (VFCO)

Significantly, the new Forestry Law has been in force since 2019 with a focus on forest tenure reform that stipulates two primary forms of ownership. Besides forests owned by the people but the State standing as their sole representative, the new law recognizes the ownership of organizations, households, individuals or population communities, who invest in planted production forests.

5.4 Economic returns of the PEFC group certification

Economics return of the PEFC group certification is calculated upon four scenarios, and with the given fixed interest rate of 6%. With no certificate yet granted, many assumptions are based on the FSC group certification in Quang Tri, particularly the total costs of certification. Moreover, the observation and interviews indicated that there was no clear difference in silvicultural practices between farmers who participate and do not participate

in the PEFC pilot programme. The production costs between certified and non-certified are thus presumed similar.

Interviews with forestry expert pointed out that with sound management practices, a five-year plantation in TTH province can produce 100m^3 ha^{-1}; the timber is solely used as woodchip for pulp and paper production. A seven-to-eight-year plantation can reach 200m^3 ha^{-1}. However, in practice, the volume greatly depends on the location of the plantation, quality of soil, and intensity of silvicultural practices. For instance, with poor-quality soil coupled with no use of fertilizer, the average volume captured through interviews in Hoa My cooperative is much lower compared with the other two cooperatives, resulting in a lower average yield in the whole study area. In these scenarios, the average yield of 1ha plantation with a rotation of five years is thus presumed at 85m^3. From the sixth year, the volume of wood growing on 1ha of a forest during one year is 25m^3 (Nambiar et al. 2014), making the average yield harvested after 8 years 160m^3. The costs of planting and maintaining 1ha-plantation and the timber prices are grabbed from interviews with many stakeholders. Harvesting costs include the costs for felling trees and peeling them at the site. The price of peeled timber at the mill gate is €40.6/m^3. Non-certified sawlogs are sold at €52.1/m^3 whilst the price of certified sawlogs is €63.3/m^3. These prices are for peeled sawlogs and also at the mill gate. The price difference between certified and non-certified sawlogs is approximately 18%. The cost of protection is paid to the commune people's committee after harvesting.

5.4.1 Scenario 1

Scenario 1 is a baseline scenario, reflecting the current situation of silvicultural practices and market in the study areas. The plantation is harvested after five years for pulpwood, which has not yet required FM certificate. The density is 2500 trees ha^{-1}, and no thinning and pruning is done. The cost and revenue of a five-year-rotation plantation are illustrated in **Table 11:**

Table 11. Cost and revenue of 5-year plantation for woodchip, baseline scenario (Currency: EUR)

No	Cost	Year					
		0	**1**	**2**	**3**	**4**	**5**
	1. Production cost						
Material costs							
1.1	Seedlings for main planting	83.8					
1.2	Seedlings for replanting	8.4					
1.3	Fertilizer	111.7	74.5				
Labour costs							
1.4	Preparing site	94.9					
1.5	Planting and replanting	124.5					
1.6	Fertilizing	125.0					
1.7	Weed control	40.6	33.9	33.9			
1.8	Protection						28
	2. Harvesting cost						
2.1	Felling and peeling						775.9
2.2	Transportation						430.4
	3. Revenue						
	Woodchip (85m^3*€40.6/m^3)						3451
	4. Profit						1485.2
Cash flow		(588.9)	(108.4)	(33.9)	(0.0)	(0.0)	(1234.3) 3451
Discounted cash flow		(588.9)	(102.3)	(30.2)	(0.0)	(0.0)	(922.3) 2578.8

5.4.2 Scenario 2

In this scenario, an eight-year-rotation plantation produces 64m^3 of sawlogs and 96m^3 of pulpwood, of which 20m^3 are harvested in the fifth year during the thinning. It means sawlogs account for 40% of the yield, and the amount of pulpwood is 60%. With a density of 1650 trees ha^{-1}, the production costs of this scenario are lower than the baseline. However, additional costs are included later due to the costs of thinning. The price of pulpwood is €40.6/m^3, and the price of sawlogs is €52.1/m^3. **Table 12** shows the associated costs and revenue from a 1ha plantation after 8 years:

Table 12. Cost and revenue of 8-year plantation (Currency: EUR)

No	Cost	Year								
		0	1	2	3	4	5	6	7	8
	1. Production cost									
Material costs										
1.1	Seedlings for main planting	55.3								
1.2	Seedlings for replanting	5.5								
1.3	Fertilizer	73.7	49.2							
Labour costs										
1.4	Preparing site	94.9								
1.5	Planting and replanting	82.0								
1.6	Fertilizing	82.5								
1.7	Weed control	40.6	33.9	33.9						
1.8	Protection									44.8
	2. Harvesting costs									
2.1	Harvesting						182.6			912.8
2.2	Transportation						101.3			632.9
	3. Revenue									
3.1	Wood chip (96m^3*€40.6/m^3)						812.0			3085.6
3.2	Sawlogs (64m^3*€52.1/m^3)									3334.4
	4. Profit									4806.1
Cash flow		(434.5)	(81.3)	(33.9)	(0.0)	(0.0)	(283.8)	(0.0)	(0.0)	(1590.5)
							812.0			6420.0
Discounted cash flow		(434.5)	(78.4)	(30.2)	(0.0)	(0.0)	(212.1)	(0.0)	(0.0)	(997.9)
							606.8			4028.0

5.4.3 Scenario 3

In Scenario 3, besides the production and harvesting costs that are presumed the same as the second scenario, the costs of certification are included. The total cost for certifying 1ha-plantation in 8 years is assumed similar to the FSC group certification in Quang Tri (Hoang et al. 2019), which is counted in seven years. The annual cost of certification for the eighth year is thus assumed to be the average of the last three years. On the contrary to FSC group certification in Quang Tri, in this scenario, smallholder farmers do not pay a fee of 2% of the extra revenue from certified timber to maintain the group entity. Certified sawlogs are paid at 20% higher price compared to the non-certified sawn timber, which is €63.3/m^3. Woodchip is still sold at normal market price. The cost and revenue of Scenario 3 are illustrated in **Table 13:**

Table 13. Cost and revenue of 8-year plantation for certified sawlogs with a price premium of 20% (Currency: EUR)

No	Cost	Year								
		0	1	2	3	4	5	6	7	8
	1. Production cost									
Material costs										
1.1	Seedlings for main planting	55.3								
1.2	Seedlings for replanting	5.5								
1.3	Fertilizer	73.7	49.2							
Labour costs										
1.4	Preparing site	94.9								
1.5	Planting and replanting	82.0								
1.6	Fertilizing	82.5								
1.7	Weed control	40.6	33.9	33.9						
1.8	Protection									44.8
	2. Harvesting costs									
2.1	Harvesting						182.6			912.8
2.2	Transportation						101.3			632.9
	3. Cost of certification									
3.1	Annual cost per ha	28.4	10.2	10.3	6.6	7.8	7.0	5.5	6.8	
	4. Revenue									
3.1	Wood chip ($96m^3$*€40.6/m^3)						812.0			3085.6
3.2	Sawlogs ($64m^3$*€63.3/m^3)									4051.2
	5. Profit									5440.3
Cash flow		(462.9)	(93.3)	(44.2)	(6.6)	(7.8)	(290.8)	(5.5)	(6.8)	(1590.5)
							812.0			7136.8
Discounted cash flow		(462.9)	(88.0)	(39.3)	(5.5)	(6.2)	(217.3)	(3.9)	(4.5)	(997.9)
							606.8			4477.7

5.4.4 Scenario 4

With the belief that the livelihood of poor farmers needs to be put forward the social and environmental angles of the sustainability, Laity et al. (2016) develop a supply chain based, multi-variable model. Aiming to address existing gaps in the current forest certification schemes, this model allows farmers to cultivate with short rotation. The extra earnings will be created from increased productivity by 20%. Instead of paying costs for getting the timber certified, in this model, farmers are only required to prove the origin of the timber that is not from controversial sources. This source of timber is allowed to be

mixed with certified timber during the production; however, the products are made from this source cannot use PEFC certified label. The model is supposedly appropriate and practical in the context of the study area, helping farmers to avoid weather-related risks and facilitating a quick capital turnover. Scenario 4 is built upon one scenario of this model. In this scenario, the material costs are assumed unchanged compared with Scenario 1. However, the labour costs increase by 5% due to extra work during the site establishment and maintenance. The increases in harvesting cost and transportation cost are 18% and 15%, respectively. The cost related to certification borne by poor farmers is thus presumed at 0. An increase of 20% in productivity results in an average yield of 102 m^3 ha^{-1}. The cost and revenue of this scenario are summarized in **Table 14:**

Table 14. Cost and revenue for 5-year plantation with an increased productivity by 20% (Currency: EUR)

No	Cost	Year					
		0	**1**	**2**	**3**	**4**	**5**
	1. Production cost						
Material costs							
1.1	Seedlings for main planting	83.8					
1.2	Seedlings for replanting	8.4					
1.3	Fertilizer	111.7	74.5				
Labour costs							
1.4	Preparing site	99.6					
1.5	Planting and replanting	130.7					
1.6	Fertilizing	131.3					
1.7	Weed control	42.6	35.6	35.6			
1.8	Protection						28
	2. Harvesting cost						
2.1	Felling and peeling					892.3	
2.2	Transportation					495.0	
	3. Revenue						
	Woodchip (102m^3*€40.6/m^3)						4141.2
	4. Profit						1972.12
Cash flow		(608.2)	(110.1)	(35.6)	(0.0)	(0.0)	(1415.2)
							4141.2
Discounted cash flow		(608.2)	(103.9)	(31.7)	(0.0)	(0.0)	(1057.6)
							3094.5

Table 15.Comparison of economic indicators of 4 scenarios

Economic indicators	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Total costs (€)	1965.5	2425.4	2508.5	2169.1
Total revenue (€)	3451	7232.0	7948.8	4141.2
PV of total cost (€)	1643.7	1753.1	1825.6	1801.2
PV of total revenue (€)	2578.8	4634.8	5084.5	3094.5
Net present value (€)	935.1	2881.7	3258.9	1293.3
Benefit-cost ratio	1.6	2.6	2.9	1.7
Internal rate of return (%)	26%	36%	37%	31%
Land expectation value (€)	3700.0	7734.2	8746.5	5117.1

The financial returns from the four scenarios are summarized in **Table 5**. It is clear that plantation forestry is a profitable investment and all scenarios bring positive returns for smallholder farmers. The comparison of Scenario 1 and 2 have found that the economic return from 8-year-rotation plantation is much higher than that of 5-year-rotation plantation. This is attributed to the production of sawlogs that attract a higher price than woodchip. It can be seen from comparing Scenario 2 and 3, a higher price for certified timber can create extra earnings for smallholders. On the contrary to some previous studies (Midley et al. 2017, Flanagan et al. 2019a,b, Flanagan et al. 2020), the price premium appears to dominate the total costs of certification, and the economic benefit of forest certification is clear. With the highest NPV, IRR and LEV, planting certified timber for price premiums appears significantly lucrative and potential in advancing smallholder plantation forestry and improving the livelihood of smallholder farmers. Additionally, the comparison of Scenario 1 and 4 has helped answer the question if it is worth spending money on the increased productivity model. It can be regarded from **Table 15** that an increase of 8.7% in total cost will yield an increase of 16.7% in the total revenue, resulting in a sound investment.

5.5 Beneficiaries of group certification in the value chain

In general, the relationships between actors in the value chain are not strong, particularly between farmers and traders. Small woodlot owners are often viewed as the most ailing actor with the majority of economic benefit assumed to move upwards towards market intermediaries and processors. The role of intermediaries is often misleading with the belief that they manipulate the market. Price often acts as the most decisive factor for

timber sales rather than a long-term commitment. The same situation occurs between farmers and wood processors who do not prefer a direct purchase from scattered small landholdings that may result in cost increases. Limited direct connection to processors makes the conventional way for farmers to sell their trees mostly through traders. Also, there has not witnessed a strong linkage between woodchip and wooden product processing industry. On the contrary, the relationship between traders and wood processors are relatively strong and intimate.

It is clear that Acacia value chain is a buyer-driven, and adopting forest certification is necessary to meet market demand. Theoretically, forest certification will bring tangible and intangible benefits to all participants in the value and supply chain. However, that is not always the case in practice (Flanagan et al. 2019a, Flanagan et al. 2020). Identifying direct beneficiaries from PEFC group certification is a tough question, partly because it is still at the early stage, and the calculation of economic returns is heavily based on assumptions.

When costs associated with certification are covered by international development agents and private sector, smallholder farmers are clearly one of the direct benefit-receivers. Besides extra profit from certified timber, they have been provided many technical supports to improve silvicultural practices and plantation productivity. However, price premium and technical assistance are not sustainable, and will quickly disappear with the closing of projects. The remaining benefit for small woodlot owners is a strengthened position in the market.

As raised during the interviews, current forest certification schemes that facilitate the production of large sawlogs may weaken the role of intermediaries in the value chain. In the existing FSC-models, timber is often sold directly to the companies under an offtake agreement. Under the changing situation, intermediaries supposedly transform or upgrade their business through being either a provider of harvesting and transportation services or a purchasing agent contracted with wood processors. However, in practice, the crucial position of middlemen makes it nearly impossible to be erased in a short time as they perform most of the tasks from harvesting to delivering wood to mill gates. Also, wood

processors often hesitate to work directly with small woodlot owners. Equal assessment and empowerment of this actor are thus essential to reinforce the value chain. Building capacity for traders in terms of business skills would strengthen the bridge between processors and consumers. In the future, holding CoC certification is a command to secure their position in the value chain.

To date, forest certification has not yet posed any impact on local carpenters and small handicraft enterprises because they only serve the domestic market. Almost all woodchip factories have also not benefited from the certified forest as FM certification is not yet a mandate for this industry. However, this may change in the future, and interviewed woodchip factories are must be well-prepared for any changes. On the contrary, big exporter like Scansia Pacific and wood processing company like Minh An, are the most apparent beneficiaries as a secured supply of certified domestic timber will make them more competitive in the lucrative international market.

5.6 Upgrading strategies for the development of PEFC group certification

Forest certification in general and group certification in particular, is a relatively new concept that demands major commitments, and the success is highly reliant on incentives institutions (Ven & Cashore 2018), and commitment of smallholders to meet management practices and technical requirements (Nambiar 2019). In general, smallholders can benefit from group forest certification schemes due to the higher price for certified timber. The price premium is the most attractive factor that attracts smallholders' participation in the forest certification schemes; however, the sustainability of price premium is still a controversial and much-disputed subject (Chen et al. 2010, Auer 2012). Rametsteiner and Simula (2003) raise a concern about the existence of premiums in the long run when the volume of certified supplies matches the respective demand. In practice, price premiums cannot be found in many European markets. Meanwhile, a common view amongst interviews was that the FSC standards are complicated for current farming level of households. Apart from that, the existing FSC forest certification scheme often operates with accreditation organizations which have specialised competence within FSC

requirements, resulting in a high dependence on foreign auditors. Interviews with the managers and participants of FSC group certification show that many of the adjustments to comply with requirements are just countermeasures. For example, besides the occasional use of toxic herbicides, the use of protective equipment is only performed during the audit. A new approach that is tailored for the country's condition and able to solve existing gaps and shortcomings is crucial for making forest certification sustained and accessible for all small woodlot owners. Several interventions are proposed by applying knowledge of upgrading strategies and combining with interviews with key experts in the forestry sector.

5.6.1 The national forest certification scheme endorsed by PEFC certification

FSC certification, with its strict criteria, requires the systematic management of the forest in terms of environment, economy and society. Meanwhile, smallholders are a very heterogeneous group, and FSC does not have a real definition of this group (Maryudi et al. 2017, Flanagan et al. 2020). Despite several efforts to make FSC compatible for smallholders such as the adoption of Small or Low-Intensity Managed Forest (SLIMF) standard, FSC still lacks adequate success in working with smallholders (Buckingham & Jepson, 2013). Indeed, after nearly 20 years working in Vietnam, the total FSC-certified areas is only limited at 2%. Flanagan and his colleagues have had intensive discussions about this issue in the past few years (Flanagan & Laity 2015; Flanagan et al., 2019a; Flanagan et al., 2020). They believe that the current forest certification schemes, which are designed for natural and large commercial plantations, are not incompatible with the small plantation managed by poor farmers. In practice, smallholder farmers have difficulty in complying with a high number of requirements, incredibly strict environmental standards. For example, with typical forestland holdings between 1-3 ha, it is hard for them to form buffer zones and conservation set-aside areas. Particularly revealing is how an interview described the FSC certification in Vietnam:

- *'Engaging in FSC certification in Vietnam, which often refers to the production of wood logs with higher value, is exceedingly complex, and particularly discriminatory to poor farmers who lack the resources to engage in the process.*

We cannot avoid the fact that the standards and criteria are more appropriate for big companies. Smallholders do not even know what biodiversity is'.

The demand for wood from certified forests will be on the rise, even within the pulp and paper industry, making the requirement of forest certification unavoidable. However, there is still much uncertainty in the economic returns of the group forest certification, owning to the lack of evidence of certification costs. Even though Hoang et al. (2019) confirm the affordability of small woodlots owners for getting their timber certified, the debates on this topic show no sign of abating. More researches in the actual costs of certification are needed to make the answer conclusive. However, an approach that avoids having poor smallholder farmers bear the burden of certification costs is always recognized as the core for the sustainability of the group forest certification. In addition, this approach must ensure the profitability and manageability for the participants, as well as long-term sustainability in the absence of external funds and support. Also essential to this approach is the development of suitable measurable compliance indicator considering the country's conditions, which should be viewed constructively as complementary approaches to increase sustainability across the forestry sector. Ways and means to localize certification bodies and auditors are prerequisites for reducing the external audit costs that appear heavily. The national forest certification scheme VFSC that is endorsed by PEFC International is thus expected to fully respond to these requirements.

5.6.2 Enhancement of forest governance and forest tenure

Enhancing forest governance and forest tenure is a foundation for not only attracting smallholders in the planted forest but also engaging them to the forest certification schemes. There is a close connection between the success of forest certification and forest tenure that is perceived at the roots of forest conflicts and prospects. The importance of tenure is reflected by its effects on the incentive framework faced by forest owners, users, and managers. (Siry et al., 2015). Good forest governance can optimize the production of goods and services from forests, being a fundamental building block for achieving SFM. Unfortunately, the current national framework appears to be weak owning to an insecure forest tenure, unclear and inconsistent policies and regulations. The importance of

progressive changes in policies and institutions in relation to the national forest tenure and governance were emphasized during the interview with a forest policy specialist. Some solution has been proposed starting from the formulation of new policies and regulations that are well-recognized and feasible to address the existing gaps.

First and foremost, there should be a focus on broadening and consolidating the rights and responsibilities of small-scale forest owners, particularly continuously allocating forests and forestland to small households. It is specifically vital when 3.1 mha of production forest remain either unallocated or managed by Commune People's Committees. Besides ownership as a prerequisite for participating in the forest certification, freedom of choice in making the land-use decision is a decisive factor engaging smallholder farmers in the plantation.

Secondly, the institutional capacity of government organizations, local authority, as well as civil society organizations, must be strengthened to provide appropriate support for forest-dependent communities, particularly in case of tenure disputes. Human and financial resources need to be allocated effectively. Besides benefit-sharing mechanisms, the national guidance for forest governance should stem from much field experience.

Apart from this, the government should facilitate more dialogues across sectors, scales and actors, focusing on alternative models of forest tenure arrangements and reinforced commitment from key actors directly involved in strengthening the national forest governance and tenure. Gender should have been mainstreamed in the national forestry policies and debate. Inclusion of women, especially among vulnerable minorities, in the decision-making process and building their capacities to participate in the national and international forestry agendas, should be emphasized.

Fourthly, the national policies should recognize the importance of each link in the forest products value chain, explicitly facilitating partnerships and joint ventures between small woodlot owners with the private sector to ultimately improve financial benefits for them. Besides, there should be an emphasis on market development, for example, provision of information about domestic and international markets for forest products, which is made accessible for all smallholders. In addition to this, the national policies must place an

intensive consideration of legality, international regulation and requirements on products from forestry. To make the revised policies to be successfully performed, strong international cooperation with external stakeholders is needed. These collaborations must be based on the basis of equality, mutual benefit and complementation, and respect.

5.6.3 Enhanced capacity of group entity for forest certification

The effectiveness of the group entity, either forest owners association or cooperative alliance, contributes significantly to the success of group certification. In essence, these two forms are proven as a suitable entity representing the group. However, as discussed in Chapter 5, they also show certain limitations. In relation to the forest owner association, the sustainability of this form is not high due to a dependence on external assistance. The structure of the association at the provincial level is relatively complicated with the cumbersome operation, and heavily administrative regulations that pay little attention to managing and maintain the association and supporting members. Additionally, the transaction costs of this form remain high and require contributions from members to maintain the group. The advantages of the cooperative alliance are many; however, it is deficient in providing forestry extensions to their members.

Regardless of the group formation, building capacity for the group entity is essential for maintaining forest certificate. The participation of smallholders in voluntary verification such as forest certification is often heavily affected by the perception of forest certification, capacity, and a supporting policy in which a transition time of up to three years is required for the group entity to fully function. In the case of PEFC certification, it should start from raising awareness for smallholders about the benefits of integrated sustainable practices and forest certification through pilot models. Besides, enhancing forestry expertise within the cooperative alliance is mandatory for improving the capacity of the group entity to self-monitor, self-evaluate, and provide services to their members. Full consultation package combined with communication at the household level are prerequisites to understanding the needs of smallholders. Additionally, there should have a strong focus on strengthening the capability of farmers to access and compete in the market through training on a business development plan. Moreover, establishing a

cooperative's harvesting team will not only upgrade the role of the cooperative in the value chain and create extra revenue but also increase the proactiveness and self-control of the organization.

Scaling up the household group appears the most feasible way to reduce the costs of certification. Not limited to that, increased economies of scales will lower the transaction costs for both smallholders and wood processing companies. Besides adding more members to existing groups, this can be achieved by encouraging the formation of new cooperatives or registration of new business entities or associations. For instance, a cooperative union is assumed as a good alternative for the group entity. Cooperative union, as a collective economic organization with more potent expertise on forestry, is believed to address shortcomings of the cooperative model, simultaneously increase trust and participation of smallholder farmers in group certification.

5.6.4 Promotion of linkages with the wood processing industry

The degree to which the benefit of forest certification can outweigh the costs is highly dependent on the actors involved in the supply and value chain (Ven & Cashore 2018). Enhancement of vertical and horizontal links in the value chain is a feasible mean to reduce the costs of group forest certification (Auer 2012, Hoang et al. 2015 a,b). Linking smallholders with the private sector is an inevitable global trend, and will soon become the main direction in Vietnam. In practice, strong partnerships across smallholders and wood industry sector can optimize the comparative advantage of all actors while securing a stable supply of legal timber and reducing poverty, particularly in the mountainous areas.

The role of the private sector in promoting forest certification is clear with a powerful example of the collaboration between the furniture giant IKEA, domestic partner Scansia Pacific, provincial partner Minh An and smallholder farmers in TTH province. The linkage helps IKEA to minimize the risk of using illegal materials while enabling smallholders to benefit from access to a loan with low interest and better price for certified timber. Also, forest certification currently improves the negotiation power of smallholders as well as upgrade their position in the chain. In regards to the domestic wood processor, besides a more secured source of material production, it is better recognized in the

international market by meeting the buyer's sustainability requirements. Nguyen et al. (2018) believe where resources are appropriately allocated, and risks and benefits are fairly distributed to all participants in the supply and value chain, collaboration is considered as a win-win relationship for both companies and small plantation growers.

There are some prerequisites for the sustainability of the out-growers schemes, in which forest companies act as the initiators, starting from the inclusion of woodchip factories to the linkage, followed by take-off contracts by buyers which can be used as collateral, and continuous technical supports. Besides, there should be proper attention from the local authority, creating a favourable investment environment for businesses, which can reinforce trust, protect companies before contract violence by smallholders, and ensure fair benefits for both parties.

5.6.5 Enhanced smallholder plantation forestry with a strong focus on productivity

Increased productivity, as a product upgrading strategy, is proven to create extra revenue for smallholders. Many compelling pieces of research has proven that productivity can be improved and sustained from the first to the second rotation by sound management practices, while the productive capacity of the soil is still maintained (Nambiar et al. 2014a,b, Harwood and Nambiar 2014, Harwood et al. 2017). The productive plantation can be achieved through one or mixed ways, including allowing small woodlot owners to access to affordable, high-quality seedlings, and improving silvicultural practices. Interviews show that although a substantial amount of smallholders aspire to keep their trees longer for a better price, short-rotation cycles are still in favour due to the economic and climate conditions. Even though the price premium is found to be the most profitable investment, the productivity model, as the best option for risk-aversion, can be viewed as a complementary intervention to increase household income. Ensuring the productivity of the forest resources, rather than being preoccupied with minimizing the costs in the short term, is not only the foundation for improving the livelihoods of smallholders but also the core of sustainability. (Harwood and Nambiar 2014; Flanagan et al. 2020).

6 Discussion and recommendations for further studies

Smallholder forestry is a profitable investment, and holding an FM certificate brings many benefits for plantation owners. The results of this study share a similarity with previous studies towards positive economic benefits of group forest certification, particularly on larger sawlogs (Hoang et al. 2015b, Maraseni et al. 2017b, Frey at al. 2019, Hoang et al. 2019). Under the current situation, where forest certification is required for sawlogs, and certified timber gets a higher price, forest certification appears financially sustainable. However, what will happen if forest certification is mandatory for pulpwood and price premium, which is not typical worldwide, no longer exist. It is without a doubt that small woodlot owners can afford forest certification although the cost of certification will reduce the net profit of the farmer. However, intangible benefits will presumably be created, for instance, in the forms of improved access to the international market and enhanced forestry sector towards a more inclusive and sustainable way. In the study region, it is also worth noting that improvements in silvicultural practices have created many positive environmental impacts. Prompt changes in plantation performance can be observed from plantations participating in the FSC programmes. The difference between the plantation participating and not participating in the scheme can be noticed in **Figure 17**. The same results are expected when the PEFC certification is put on place.

Figure 17. Plantation without and with forest certification

Forest certification is proven to create tremendous economic benefits for smallholders producing sawlogs. To date, prolonging the rotation age is the only way enabling the

farmer to join the certification scheme. However, whether the economic returns are as high as assumed is questionable when the cost of risk is unclear. There are critical omissions, some of which have been identified. In practice, TTH province is among the most disaster-prone areas of the country, being subject to severe extreme disasters such as typhoons and floods that have appeared more serious in recent years and caused devastation to the entire province. (Tran & Shaw 2012, Paudyal et al. 2020). In the study area, smallholders have to face a high chance of dead loss if the plantation is swept by the typhoon. Fallen trees can only be sold for woodchip factories at a much lower price. The cost of risk, together with opportunity costs such as delay in return is not yet be quantified in monetary terms (Deusen et al. 2010), resulting in the somewhat optimistic results for lengthening rotation and adopting forest certification. When considering the conditions of smallholders, investing in increased productivity model appears as a rational solution. However, this model has also certain limitations, one of which is if the continued production of woodchip is against the government's attempt to increase the area of plantation for producing timber to ensure the material sources for the domestic furniture sector. This model is relatively new and needs more time to be considered and cutinized.

In conclusion, the comparison between costs and benefits of forest certification in general and PEFC group certification, in particular, is still of broad and current interest. In general, forest certification has created certain economic benefits for the farmers. However, when there are many costs and benefits yet to be quantified in monetary terms, a few uncertainties thus remain. There are still many things to do to answer the question if the return of investment from forest certification is sufficient to make it attractive to poor farmers and a good tool to manage the risk associated with forest management. In the case of Vietnam, debates on the financial sustainability of forest certification have resulted in two interesting topics: enhanced smallholder plantation forestry, and which rotation is a better solution in relation with the conditions of Vietnamese smallholders.

6.1 Enhancement of smallholder plantation forestry

Globally, smallholder plantation forestry is not yet a common source for industrial wood in the large scale. However, with a declined supply from natural forests, its contribution

in securing the sustainable supply of timber is more critical than ever. Besides, plantation forestry offers a potential mean for smallholders in alleviating poverty and fighting climate changes (Sikor & Baggio 2014, Nambiar 2019). More importantly, strengthened plantation forestry is deemed to reduce the costs of forest certification through lower costs of establishment or costs of correcting to meet the requirements. In the context of Vietnam, where there is still a high demand for land for industrial agriculture, infrastructure development, population growth, and urban development, opportunities for the expansion of plantation forestry are bounded. However, on the other hand, competition in land-use can boost the development of more intensive management and technology, aiming at higher productivity

Investing in smallholder plantation forestry is long-term and risky. Even though it has been considered as a mainstream activity in last decades, tree planting mainly reflects farmers' own initiative of improving their livelihood. To date, smallholder plantation forestry is mainly managed in a way that hardly optimizes the productive capacity. This issue can be attributed to many reasons starting from the recent lower selling prices, which has resulted in the reduction of farmers' investment. Secondly, smallholder farmers often face limited access to high-quality inputs and technologies required for sustainable management and profitable production. They are unlikely to be integrated into the value chains, and their wood often ends up in shallow value markets. Furthermore, like many countries in Southeast Asia, the expansion of planted forests is challenged by ambiguousness of land tenure, access and ownership (Midgley et al. 2017, Nambiar 2019). Meanwhile, the government still lacks a support package, including funds and resources to fully exploit the productive capacity of plantation forestry.

Strategies for a sustainable development of smallholder plantation forestry is pretty much same as forest certification that require involvement and commitment from the key stakeholders, starting from improved land tenure policies, revision and reinforcement of legislation and regulations, which emphasize, recognize and integrate small woodlot owners into supply chains. Afforestation policies favourable to poor households need to be beyond the goal of improving incomes. It should focus on enhancing livelihood resources and allowing smallholder farmers to make their own decision of land-use in

response to local market opportunities and profitability (Nambiar 2019). Existing extension services must be revised and reinforced with long-term perspectives, and strengthened partnerships with other actors through feasible and mutually beneficial, fair and transparent agreements. Additionally, the government can also facilitate the development of plantation forestry by creating a forum for policy dialogues among specialized state management agencies, local authorities and households.

Secondly, adding value to smallholder forestry should be incorporated into the sector development plan, particularly concentrating on improved productivity, quality, certification, and due diligence. For example, presently, most of the raw materials in the region are eventually exported as woodchip with relatively low value. Meanwhile, this source of materials is an enabling condition for investing in pellets that are considered as a very versatile fuel offering a cost-effective solution for producing heat and power, particularly in agricultural production. The development of a pellet-based power system will firstly lessen the impacts of the alternate electricity cut in summer and later contribute to the regional electricity secure. Besides, diversification of income sources through beekeeping or growing medical plants interspersed with Acacia trees might give farmers a buffer against economic shocks and timber price fluctuations. Addedly, there should be a focus on diversifying funding resources, especially from the private sector and creating take-off contracts by buyers, which can be used as collateral. Equipping smallholders with the management, marketing, and negotiation skills, coupled with revamped extension services and will attract their investment in plantation, scale up their position in the market, and most importantly upgrade their role in the chain. However, in order to make it happen, the cooperation amongst the farmers' organizations is very important.

Limited access to finance and weather-related risks are the critical barriers preventing smallholders from investing in their plantation. To date, there are very limited financial incentives provided to smallholders to establish commercial plantations. Fear of being unable to pay the debts is also hindering farmers from borrowing money, while insurance companies refuse to offer services to smallholders with high risks associated with disasters. Therefore, in order to encourage small woodlot owners to grow high-quality sawlogs, the government should implement and provide incentive policy on long rotation

plantations and cost-sharing mechanism on insurance and certification. In addition, business analysis tools and training for different actors involved must be developed, including the improved capacity for business incubation within large membership organizations. Besides improving organizational and management capacity through linking small woodlot owners into groups, cooperatives and associations, the focus should also be laid in enhancing these organizations to mobilize investment from investors.

Finally yet importantly, there should be more comprehensive studies on plantation forestry with a strong focus on the needs of tree growers, followed by environmental impacts of plantation forestry and its contributions to carbon sequestration and climate changes (Harwood & Nambiar 2014). This will require not only immense investment from both public and private sectors, but also a collaboration between smallholders and their organizations with government, private sectors, international donors, and research organizations. However, investing in researching and developing effective learning systems can create a solid foundation for the inclusion of plantation forestry in the sector development plan as well as climate initiatives. Partnerships and engagement of smallholders in national and international agendas can unblock support and overcome all existing barriers. In short, the future of smallholder forestry looks promising if appropriate models and frameworks tailored for national and local conditions are established. When located accordingly, it can boost economic growth, especially in rural areas, and as well as help protect the environment. Enhancing of smallholder plantation forestry is also a determinant for the success of the group forest certification.

6.2 Debate on long-rotation and short-rotation plantation

There are many debates and dialogues about whether a long or short-rotation Acacia plantation can create sustainable benefits for small plantation growers. Comparative advantages of long-rotation are clear. Besides adding value to pulpwood, lengthening rotation to produce sawlogs has posed many positive impacts on the environment. Increasing forest coverage is not only stabilizing groundwater and flows of rivers, improving water quality and soil fertility, but also restraining land degradation. (Harwood & Nambiar 2014, Tran et al. 2014). The GoV has recently implemented many policies to

limit the production of woodchip, and promote the planting of perennial trees for timber, aiming to lessen the pressure on native forests for the source of raw material (Hoang et al. 2019). This move is receiving mixed opinions from scientists, researchers, and policymakers. Can longer rotation bring real benefits for smallholders when it simultaneously creates major challenges including delay in return and increased risks of stand loss or damage from extreme weather events that farmers have no insurance to cover such damages? There is an opinion that this direction is only benefiting wood processing sector instead of improving the livelihood of the poor farmers.

Short-rotation plantation is often managed in an intensive but integrated way towards a high rate of production. It is a relatively new venture in forest management and widely favoured by smallholders in Central Vietnam due to lower exposure to annual disasters that are more severe every five years. Besides faster returns of investment and increased flexibility, short-rotation cycle enables a quick reaction with the changing conditions and markets such as pest and disease outbreaks or buyer's requirements through altering germplasm. Additionally, experimental pieces of evidence demonstrate improved growth rate and site quality over successive short rotations with sound management practices. (Tran et al. 2014, Harwood & Nambiar 2014). The comparative advantages of short-rotation are many; however, some certain limitations appear, particularly when it is coupled with a single species. Overharvesting every 4-5 years is assumed to adversely result in site degradation, inter-annual variation in climate and biological threats such as pest and disease (Nambiar et al. 2014a,b). The impacts on the environment can be more severe if a single species is planted in large areas, particularly on previously forested regions (Stephens & Wagner 2007). However, in reality, there is still a lack of scientific evidence back this assumption as a global case. (Harwood & Nambiar 2014).

Both pros can cons can be found in these two management practices. However, the selection needs to harmonize between the conditions of the farmers and the country's direction. In the context of Vietnam, the debates over long and short rotation often result in an open dispute on the sustainability of benefits obtained by price premiums for certified timber and increased productivity that can apply to both long and short rotation, but often referring to the later one. Pieces of evidence show that price premiums are

directly benefiting small tree planters who are participating in the FSC group certification, being the most determinant for participation and engagement of smallholders in the scheme. However, the price premium is not a global phenomenon and cannot be sustained the long-term. Thus, anticipating benefits from premiums needs to be treated with caution.

In practice, there is no absolute answer for the selection between short or long rotation, as well as price premiums or increased productivity. Price premiums will soon disappear with the rising area of the certified plantation, while increased productivity often requires external supports and often beyond farmers' ability to self-access. Thus, to advance smallholder plantation forestry, any given strategy must prioritize and cautiously consider the capacity and need of farmers. Improved productivity should be promoted and adopted in preference to price premium as they deliver broad supply chain benefits.

7 Conclusions

This thesis that is arrived with primary data from a wide range of key informants provides a thorough picture of small woodlot owners in Central Vietnam, and how well they perform in the Acacia value chain. It also gives an overview of the development of group certification, its impacts on all participants in the value chain, as well as the extent to which the cost of certification is affordable for smallholders.

With an average contribution of nearly 22% to the total net annual income, plantation forestry is a financially sound investment, presenting a good opportunity for the study region as well as smallholder farmers. However, forest growers have suffered from benign neglect by policymakers as well as the international community. They face severe bottlenecks hindering their possibilities to manage, protect and use their trees sustainably and effectively, starting from the lack of access to good quality genetic materials and extension services. A majority of smallholder farmers in the study province tare vulnerable and disadvantaged, impoverished and poorly educated with little collateral and limited access to capital at acceptable interest rates, and are generally unfamiliar with the commercial and legal demand of wood products value chain. They are also risk-averse and respond quickly to threats such as market uncertainties and damages by storms and diseases. Those characteristics are rarely compatible with complicated regulatory such as

certification schemes, which supposedly narrow farmers' freedom of choice, and impose substantial costs for minimal compensatory benefits.

There is a strong correlation between landholdings and prosperity. The wealthier households with more than 10 ha are likely to benefit more from planted forests than the poor, who cannot afford advanced technologies and resources or keep their trees longer for a higher profit. However, impoverished households can earn money through forestry-related job opportunities such as tree growing, tending, harvesting, peeling, transportation, working in wood processing companies, and NTFPs. Enhancing smallholder forestry towards sustainable and profitable forest management is not only improving livelihoods in rural communities but also contributing substantially to domestic, commercial wood supply chains.

Forest certification claims to be environmentally, economically and socially beneficial. Despite an increasing demand for certified timber, smallholder plantation areas having certified are relatively small, partly due to small landholdings. Group certification is thus considered an appropriate way to allow small-scale producers to engage in this international voluntarily verification schemes. Until now, several group certification models have been piloted and implemented across the country with financial and technical supports from international agents and the private sector. In practice, these models have yielded promising benefits for small forest owners. In TTH province, FSC certified timber is currently sold at 15-20% higher price compared to non-certified wood. Besides access to a loan with low interest, offtake agreement with the wood processor is another main reason attracting smallholders to join together under a single certificate. However, the effectiveness of FSC certification is a much-debated topic, receiving mixed opinions from scientists and policymakers. To date, besides a study by Hoang et al. (2019) confirming the affordably of smallholders for forest certification, recent pieces of evidence view forest certification as an extraordinarily complex and costly mechanism, being incompetent for managing risks. The cost of for certified timber will be borne by growers, who are by nature low on overhead costs when the donor funding ends. Additionally, FSC certification is often associated with the lengthening rotation to produce sawlogs, which poses additional risks of natural disasters for vulnerable smallholders.

There is an imperative that forest certification does not become just another barrier for smallholders' inclusion in markets and forest sector economies. Moreover, certification should better address and guide smallholders' needs for increased forest productivity and more secure output. Forest certification and group certification specifically, should be designed in locally relevant ways that support smallholders to access market and investment, and ultimately unlock the value of smallholder forest resources. With improvements, forest certification could be a tool to truly support rural development, poverty reduction and help optimize the forest sector's contribution to the green economy. Currently, The PEFC group certification with CAs as the group entity is the newest pathways that are exceptionally suitable with the peculiarity of Vietnam. In practice, the existing well-functioned cooperatives system has acted as a bridge, actively coordinating and linking smallholders with forestry businesses, relevant scientists and technicians, authorities and agencies.

Four scenarios are built upon assumptions that draw different outlooks of group forest certification and smallholder plantation forestry. The results reveal that smallholders' earnings from certified forests are higher, owing to the price premium for certified timber. Thus, the financial sustainability of the group certification can be guaranteed when farmers can afford the cost of certification. However, it is essential to note that extra revenue is created not just from certified wood, but increased value due to longer rotation. In this case, the calculation is not fully reflective when the cost of risk, as well as cost of loss due to delay return of investment, are excluded from the assumptions. Under the current situation, forest certification has yet posed many significant changes in the value chain. Smallholders and furniture processors for exporting are the direct beneficiaries. When the market of the domestic woodchip factories does not require certified timber, the adoption of group forest certification for farmers only reduce their income from planted forests. The situation is the same for the local middlemen who collect materials for woodchip production, and small carpenters who only serve the domestic market. There is an option that the introduction and development of forest certification will impact the position of intermediate traders in an adverse direction; however, this is unlikely to happen in practice.

Besides common obstacles associated with insecure land tenure, limited technical and financial capacity, the main challenges for joining a group certification is perceived differently between smallholders, and practitioners and policymakers. While little awareness of forest certification, small landholdings, and weather-related risks are primary obstacles of farmers, representatives from government, research institutes, and NGOs assume the issues in the lack of sufficient guidelines from the government, high costs of certification, and missing enabling policies. PEFC group certification is additionally challenged by a high demand for FSC certification and a group entity that still has much controversy.

While much of the information regarding forest certification in Vietnam is dire, there is a reason for hope. The success of forest certification requires a commitment to changes from smallholder farmers, coupled with immense investment from both the public and private sectors. The study suggests several interventions for expanding forest certification, starting from recognizing smallholder farmers as a distinctly different category of forest producers whose conditions need to cautiously considered when developing standards for group certification. Secondly, there should be a strong focus on capacity building for the group entity as well as raising awareness for members of group certification. Thirdly, linking smallholders with private sectors are not only attracting more investment but also widening market access for farmers. Additionally, the importance of secure tenure, clear guidelines for implementing SFM and forest certification, incentive policy and cost-sharing mechanism on insurance and certification must be emphasized.

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Annexes

Annex 1: Questionnaire for FGD in cooperatives

FOCUS GROUP DISCUSSION IN COOPERATIVES

Economic impacts of PEFC group certification on smallholder farmers

FGD number:	
Cooperative:	Date and time:

A. IDENTIFICATION OF PARTICIPANTS

Number of participants: _____, including:
- Cooperative's representative:
- Farmers:
- Experts:
- Others (identified):

B. ORGANIZATIONAL STRUCTURE AND OPERATION OF COOPERATIVE

1. How is the cooperative organized?

- Structure of the cooperative: general assembly, departments
- Members of the cooperative: farmers, local companies, etc.
- Cooperation among cooperatives

2. What are the main tasks and responsibilities of the cooperative? What kind of services do you offer to your members?

(✓)	Type of service	Notes
	Governance	
	Financing	
	Education & training	
	Information & Technology	
	Management	
	Inspection	
	Consultation	
	Others	

3. What do you consider the main strengths and weaknesses of your cooperative?

C. CURRENT STAGE OF FORESTRY

4. How is the ownership of forests within the cooperative?

Owner	Forest area		Notes
	Area (ha)	%	
Forest management board			
State enterprise			
Households			
Community			
Army			
Other			
Not yet allocated			

5. How is the governance of the Acacia value chain structured?
6. How is the importance of forestry in economy of the region in general and the livelihood of farmers in particular?

Source of income	Net income		Notes
	Amount (VND)	%	
Forestry			
Agriculture			
Husbandry			
Handicrafts			
Others			

7. What determines the price of timber? (Demand and supply, international prices, quality, quantity, etc.)
8. How and why do the quantities and qualities produced vary between years? (Weather, climate change, forest health, personal reasons, etc.)
9. What are the biggest problems and challenges that the farmers of the cooperative face regarding?

- Regarding production (soil quality, fertility, diseases, information, technology, etc.)
- Regarding the quality of timber
- Regarding prices (market shocks and trends)
- Other problems/ challenges

D. CURRENT STATE OF SUSTAINABLE FOREST MANAGEMENT AND TIMBER CERTIFICATION

10. What motives you from being involved in (PEFC) timber certification?
11. What kind of supports has the cooperative externally received?
12. How does PEFC group certification in your cooperative work?
13. How do you perceive the benefits and drawbacks of PEFC group certification?

14. How do you anticipate the costs of PEFC group certification?
15. To what extent is the preparation of PEFC group certification within the cooperative? What do you see as the critical next steps?
16. Is there any other timber certification currently considered besides PEFC certification? If yes, how do you perceive the differences between this scheme and PEFC certification?
17. In your opinion, what are the biggest issues in the implementation of PEFC group certification and how to tackle them?

E. FINANCIAL ISSUES

18. How do the cooperative organize the financing
19. How do financial supports from public or private programs work?

Is there anything else that you would like to add?

Annex 2: Questionnaire for smallholder farmers

QUESTIONNAIRE FOR SMALLHOLDER FARMERS

Economic impacts of PEFC group certification on smallholder farmers in Central Vietnam

Interview number:	
Place:	Date and time:
Information of interviewee:	
Name:	Age:
Gender:	Telephone:
Educational level:	

A. BACKGROUND

1. How can you describe your experiences of forestry?
2. How much autonomy do you have in regards to the decision-making of for example production, selling, or participation in timber certification, and the price defining?
3. How do you perceive the trust between actors within the cooperative?
4. How easy can you access to governmental or private loans?

B. FORESTRY AS A LIVELIHOOD

5. What is the total area of your plantation and total annual volume (m^3)? Do you have certificate of land-use rights?
6. What is the price of timber (VND/m^3) and how does forestry contribute to your total income?

Source of income	Net income		Notes (E.g. No of days spent/ year, etc.)
	Amount	%	
Forestry			
Agriculture			
Others			

7. Do you strictly follow forest management guidelines (E.g. Optimal rotation age, thinning, etc.)? If not, what are the reasons?
8. What are your biggest problems and challenges regarding:

- Inputs (seedlings, equipment, chemicals, etc.)
- Production (soil quality, fertility, diseases, information, technology, etc.)
- Harvesting and transport
- Quality of timber
- Prices (market shocks and trends)
- Others

9. Do you concern requirements regarding working safety and protection of biodiversity?

C. SUSTAINABLE FOREST MANAGEMENT AND TIMBER CERTIFICATION

10. To what extent are you aware of sustainable forest management and PEFC group certification?
11. What factors drive you from (not) being involved in (PEFC) timber certification?
12. How are you currently supported to attain PEFC group certification (financing, capacity building, etc.)? Will you get paid in advance or arrears?
13. How reliable do you perceive PEFC group certification and what do you expect from the certification?
14. What are the main barriers for keeping you engaged in a group certification?

D. MARKET ISSUES

15. Who are your main buyers and how do you interact with them?
16. What limits you from direct selling to companies? (Harvesting and transport, etc.)
17. What are your biggest problems to encounter when trading in the market? (Market requirements, laws and regulations etc.)
18. How do you deal with the volatilities of demand and prices?

E. DEVELOPMENT ISSUES

19. Are you satisfied with the current support? Why (not)?

20. Do you have any request and recommendation for the authorities regarding certification?

Is there anything else that you would like to add?

Annex 3: Questionnaire for middlemen/traders

QUESTIONNAIRE FOR MIDDLEMEN/TRADERS

Economic impacts of PEFC group certification on smallholder farmers in Central Vietnam

Interview number:	
Place:	**Date and time:**
Information of interviewee:	
Name:	
Company/ Position:	
Telephone:	**Email:**

1. How can you approach and react with smallholder farmers? Directly or through any intermediary mean?
2. Who are your direct customers and how do you interact with them?
3. Do you normally do the stumpage sale or lump sum sale? If you do the stumpage sale, do you have your own means of harvesting and transportation (equipment, human resources, etc.) or you have to lease from outside providers
4. Do you directly deliver harvested wood to the customers' warehouses or you have you own warehouses?
5. To what extent are you aware of timber certification and the implementation of PEFC group certification?
6. To what extent does PEFC certification affect your business from your perception? Do you think it will negatively influence your revenues?
7. What factors help you exist in the context of timber certification?
8. How can you do to tackle negative impacts of PEFC group certification on your business?
9. How do you perceive the success of the PEFC group certification?

Is there anything else that you would like to add?

Annex 4: Questionnaire for companies

QUESTIONNAIRE FOR WOOD CHIP FACTORIES/ WOOD PROCESSING COMPANIES

Economic impacts of PEFC group certification on smallholder farmers in Central Vietnam

Interview number:	
Place:	Date and time:
Information of interviewee:	
Name:	
Company/ Position:	
Telephone:	Email:

1. Can you briefly introduce about your company and where do you position in the market? Where do you fall in the value chain?
2. Who are your main suppliers? How do you perceive effects of timber certification on your supply of raw materials?
3. How do you consider direct buying of certified wood from farmers? What factors may restrict you from this buying?
4. What are your main export destinations (if have)? How can timber certification upgrade your position in international market?
5. Do you compulsorily and/or voluntarily conform any standard that is required by your buyers?
6. Are you aware of PEFC certification? What factors motivate you (not) to participate in this scheme?
7. What do you consider the main challenges for your companies resulting from PEFC certification?
8. How reliable do you perceive the PEFC certification and how do you prepare for this scheme?
9. What do you consider the main barriers for the implementation of PEFC certification?
10. How do you perceive the future of the sector in the context of timber certification in general?

Is there anything else that you would like to add?

Annex 5: Questionnaire for governmental institutions, research institutes and NGOs

QUESTIONNAIRE FOR GOVERNMENTAL INSTITUTIONS AND NGOs

Economic impacts of PEFC group certification on smallholder farmers in Central Vietnam

Interview number:	
Place	Date and time
Information of interviewee:	
Name:	
Organization/ Position:	
Telephone:	Email:

(*) The number and selection of the interview questions is dependent on the nature of the organization.

1. To what type of organization do you belong? What is the role of your organization in the sector?
2. How do you describe your experience with timber certification? What factors motivate you to be involved in timber certification?
3. How do you perceive the state of the sector in these recent years?
4. How is the current state of timber certification in Vietnam? What room is there for PEFC certification as part of the value addition?
5. How do you perceive the possibility of timber certification changing the governance of wood value chain?
6. To what extent do forest certification go beyond regulation?
7. What are differences in the implementation of PEFC and FSC in the context of Vietnam? What makes PEFC certification more feasible than FSC certification, and vice versa?
8. How do you perceive the double certification FSC and PEFC in the context of Vietnam?
9. How do you consider forest group certification? How do you perceive the current conditions of smallholder farmers in obtaining PEFC group certification?
10. How do you anticipate direct costs associated with group PEFC certification?
11. How do you perceive the benefits and drawbacks of PEFC group certification?
12. ‘‘It is said that premium price is just a short-term outcome of timber certification’’, do you think about this statement?
13. In your opinion, what actions could make PEFC group certification efforts more effective?
14. In your opinion, what are the requisite conditions for the success of PEFC certification?
15. In your opinion, what are the main barriers for the implementation of PEFC group certification?
16. How do you perceive the future of the sector in general and timber certification in particular?

Is there anything else that you would like to add?

Annex 6: Questionnaire for participants of FSC group certification

QUESTIONNAIRE FOR COOPERATIVES AND PARTICIPANTS OF FSC GROUP CERTIFICATION

Economic impacts of PEFC group certification on smallholder farmers in Central Vietnam

1. What is the reason behind your participant in the FSC forest certification scheme?
2. How does the FSC group certification practice?

   a. How do supports from public or private programs work? (Finance, Capacity building, etc.)
   b. How are farmers supported? Do you get paid in advance or arrears?
3. How does FSC group certification impact current state of forest sector in Quang Tri?
   a. How does the forest management change?
   b. How is forest resilient to trends and shocks? (Climate change, market, etc.)
4. How does group certification impact the governance of wood value chain?
   a. How do smallholder farmers interact with other actors in the value chain?
5. How does group FSC certification improve farmers' livelihood?
   a. How do quality and quantity of timber change?
   b. What prices do farmers get for the certified wood?
   c. How much do wood prices increase?
6. How reliable do you perceive timber certification in general and FSC certification in particular?
7. Identify key ingredients for success of FSC group certification that you would like to share.
8. Identify the biggest barriers in the process of implementing FSC group certification.
9. What do you consider the biggest opportunities are FSC group certification offering?
10. What are the biggest issues in the maintenance of FSC group certification and how to tackle these problems?
11. Are you willing to continuously participate in the forest certification? Why (not)?
12. Have you considered PEFC group certification besides FSC? Why (not)?
13. How do you advice the implementation of PEFC certification?

Is there anything else that you would like to add?

Annex 7: Observation form for planted forests

OBSERVATION OF PLANTATION FORESTRY

Economic impacts of PEFC group certification on smallholder farmers in Central Vietnam

Survey number:	
Place (cooperative, district)	Date and time:
Woodlot owner:	Interview ID:

A. GENERAL WOODLOT DATA

1. Coordinates by GPS:

							N
							E

2. GPS accuracy: _____
3. Total area of the woodlot: _____(ha)
4. Planting time: _____
5. Species: _____
6. Distance from the household: _____(km)
7. Distance from the nearest road: _____(km)

B. PLOT MESUREMENT:

1. Density: ____(trees/m^3). Distance between 2 trees: ____(m). Distance between 2 row: ____(m)
2. Sampling trees:

No	DBH (cm)	Height (m)	Note
1			
2			
3			
4			
5			
6			
7			

C. PLOT OBSERVATION:

Observation	Evaluation				Notes
Presence of trees damaged by insects/fungi	Not at all	Slightly	Present	Highly	
Presence of trees damaged by storm	Not at all	Slightly	Present	Highly	
Presence of trees damaged by fire	Not at all	Slightly	Present	Highly	
Presence of other deformations	Not at all	Slightly	Present	Highly	
Evidence of slash and litter management:	Not at all	Slightly	Present	Highly	
Evidence of weeding:	Not at all	Slightly	Present	Highly	
Evidence of refilling:	Not at all	Slightly	Present	Highly	
Evidence of pruning:	Not at all	Slightly	Present	Highly	
Evidence of thinning:	Not at all	Slightly	Present	Highly	